IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication NOVEMBER 9, 1961

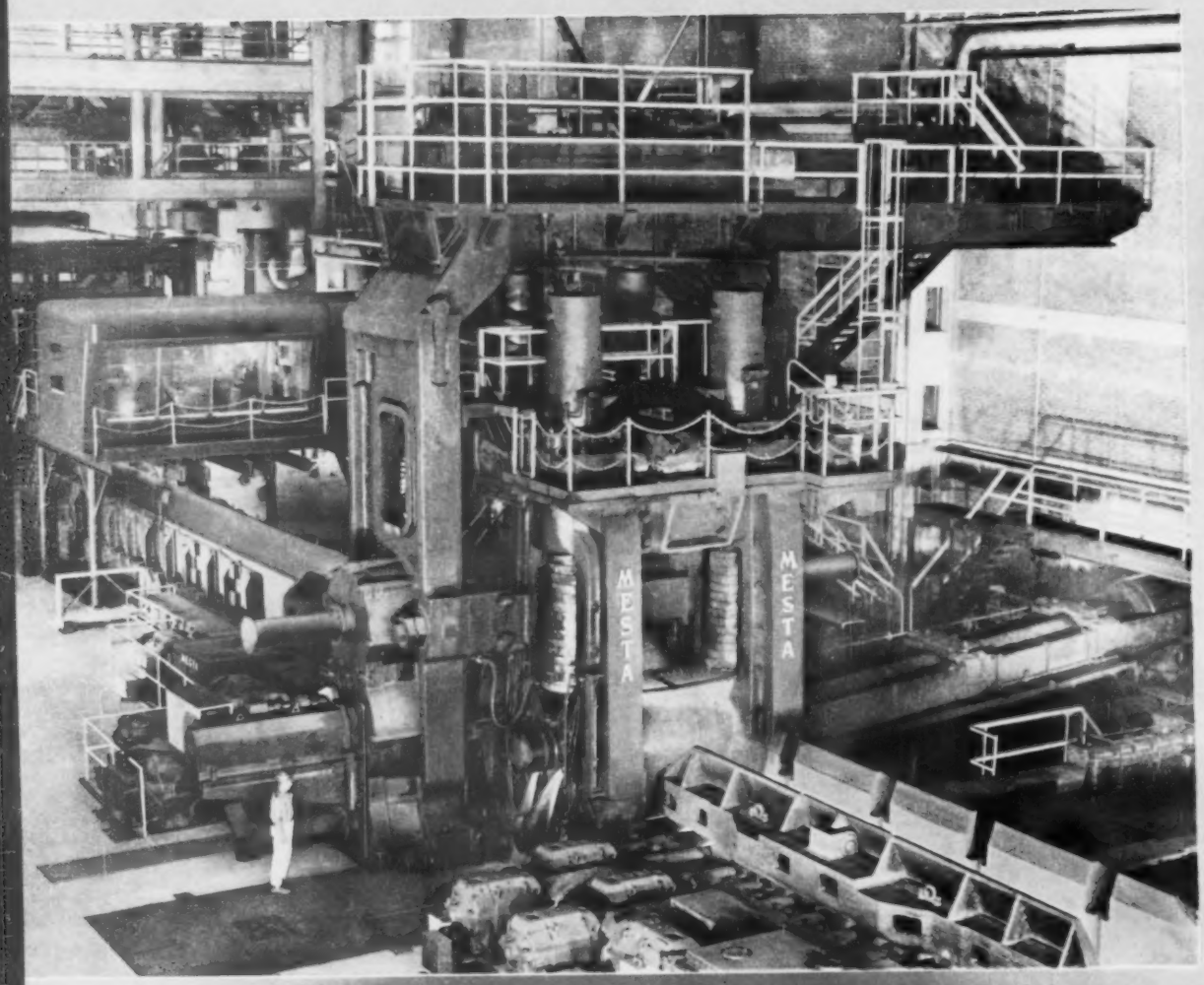
★ On Test Track at International Harvester—

Truck Engineers Fight To Cut Weight, Fuel p. 79

What Broke Steel Scrap Prices? p. 82

Press Die-Forms Huge Shafts p. 109

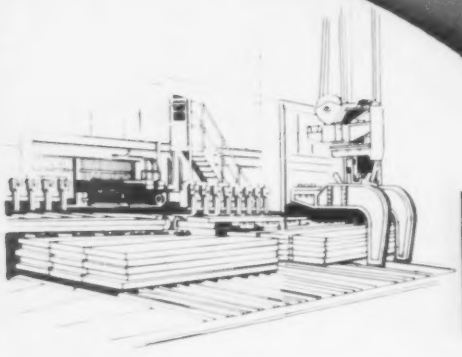
Digest of the Week p. 2-3



Rolling Ingots into Slabs on a
MESTA Universal Reversing Slabbing Mill

SLABBING MILLS

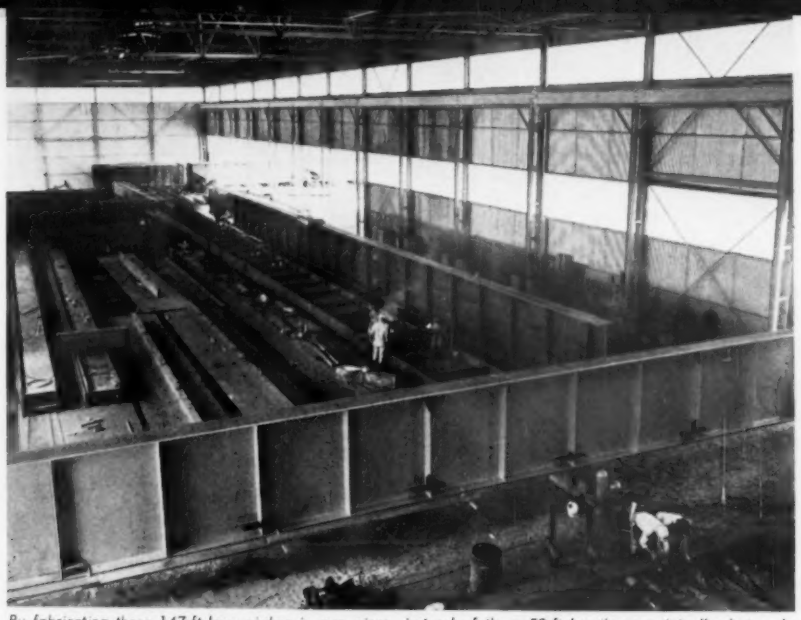
Designed and Built by MESTA



Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA



By fabricating these 147-ft long girders in one piece, instead of three 50-ft lengths as originally designed, assembly time in the field was greatly reduced.

Costs held down by flatness and good surface of Bethlehem plates... reports bridge fabricator

Fabrication of 12 steel-plate girders for a North Carolina bridge presented some king-size problems for Colonial Steel and Iron Co., Salisbury, N. C. The girders measure 147 ft long, 7½ ft high, and each weighs 30 tons.

Their large dimensions made them tricky to handle in the shop. And it took careful planning when they were trucked to the site.

Bethlehem steel plates were used in fabricating the girders. Colonial's president, Joseph Poterala, said he chose Bethlehem plate because flatness and surface condition were extremely important in keeping costs down. He knew he could count on these qualities from Bethlehem.

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IRON AGE

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Special This Week

Truck Engineers Fight Weight Costs

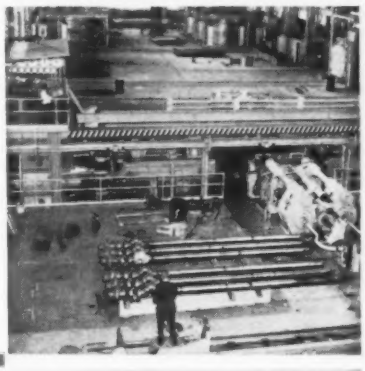
Truck engineers are counting their metallic calories. In an effort to build lighter vehicles which will increase productivity, they're experimenting with many new materials and processes. This week's Special Report examines the cost-improvement battle now raging among truck builders and outlines its long-term effects. p. 79

Scrap Market Slump May Get Worse

After eight months of stability, scrap prices started to slump a month ago, then went into a nosedive the first week of November. Export has collapsed. And mill demand is dropping. Scrapmen hope for a January pickup, but many are pessimistic. p. 82

Round Bars Become Huge Crankshafts

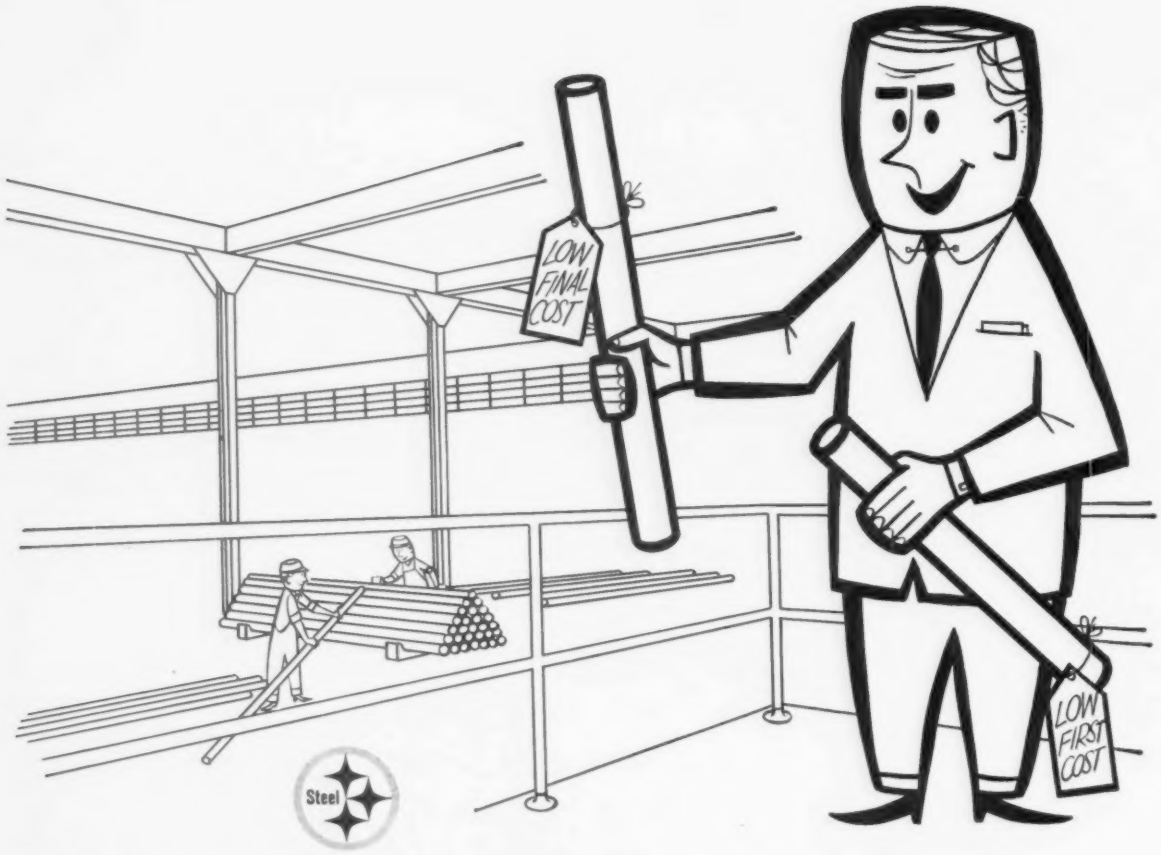
Combining upsetting and offsetting strokes, a multi-directional forging machine shapes diesel locomotive crankshafts. All shafts are forged with controlled grain flow and distortion-free eccentrics. The forgings require little follow-up machining. p. 109



Next Week

Big Changes Along the Ohio

A major overhaul of Ohio River navigation is in the works. It means an entire revision of transportation from the Midwest to the Gulf. New week's Special Report evaluates the full implications of what's going on along the Ohio valley.



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Lost Art of Listening: Let Us Bring It Back Again

The late Eugene G. Grace—a steel man of unusual stature — commanded respect and, at times, affection. We wrote this, among other things, when the steel industry lost him.

Not long after our piece appeared we heard from an equally strong character in the long line the industry has produced. This message was from that indestructible man of humor, dedication, and humility, Walter S. Tower, former president of the American Iron and Steel Institute.

Mr. Tower agreed with all we said about Mr. Grace. But he added something that was lacking in the eulogy. He made the point an outstanding human trait Gene Grace possessed was listening to people. That we should have known because of our own encounters with Mr. Grace.

In this world of talk and talk and interruptions, Mr. Grace's habit of listening through until a man had had his say is a lost art. In fact, it hardly exists anymore.

Of course it is not worthwhile to listen to fools. But most of the time the man talking is neither a fool nor a dullard except in that he may disagree with our pet beliefs.

We could get more out of life and more out of our work if we attempted to listen to our fellowmen more often—and longer. If you don't believe this, notice the next time you are in a group how many people are interrupted by others before they even get started on what they have to say.

Note at your next meeting or conference how often a speaker is stopped in his tracks by someone who has to make a point—without ever having listened for a moment. This is more of a handicap today than ever before.

If there ever was a time when we ought to listen a little more so as to dilute some of our thoughts with the experience and judgment of others, this is the time. But it may be a lost cause. Mr. Grace was never in love with his own voice. Even though he listened—and was able to gage the other person, pick up valuable information, and be kind at the same time—he ran well the second largest steel empire in the world.

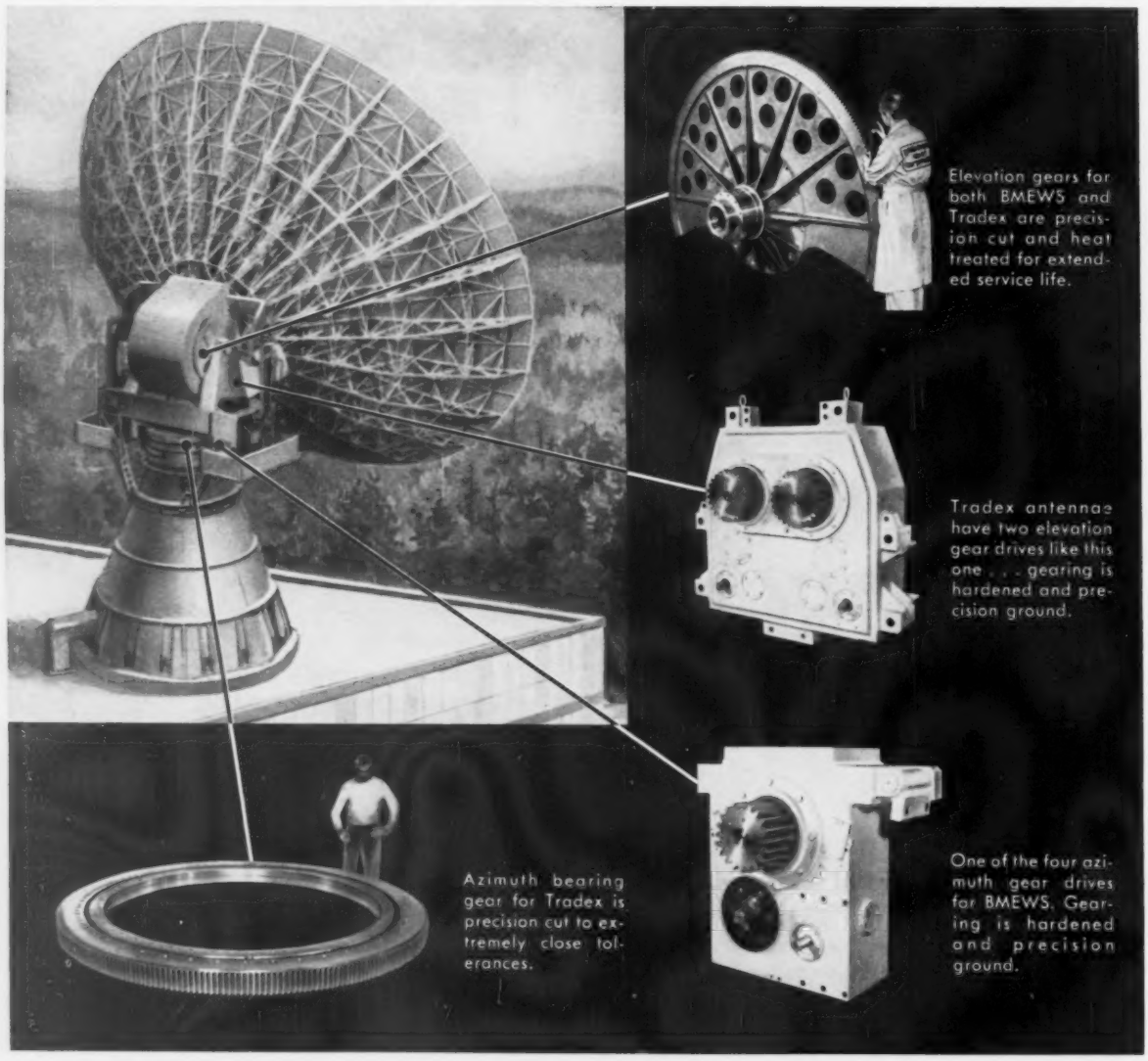
Aside from producing some dividends in our own thinking, listening is a good exercise in self-discipline. It might take some time to learn this lost art, but it can be done.

And it will be worthwhile not only in what it does to us; it will be a revelation in what it does to the dignity of the other person.

Tom Campbell

Editor-in-Chief

PHILADELPHIA GEARS AND DRIVES power BMEWS and TRADEX antennae


Elevation gears for both BMEWS and Tradex are precision cut and heat treated for extended service life.
Tradex antennae have two elevation gear drives like this one . . . gearing is hardened and precision ground.
Azimuth bearing gear for Tradex is precision cut to extremely close tolerances.
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AGMA MEMBER

Metalworking Newsfront 1

Recovery Gets Its Second Wind

As the month gets underway, the business recovery seems to be getting its second wind. The foot-dragging caused by model changeover and labor trouble in the auto industry is largely cleared up. Steel is turning up again after a lag of several weeks. Durable goods orders are showing fresh strength on a broad base, and stock buildup is on the rise.

Also, Uncle Sam's new spending spree is near the hardware-buying stage.

Another sign: 16 of the 29 leading indicators in the new Commerce Dept. Business Cycle Developments series point to further gains.

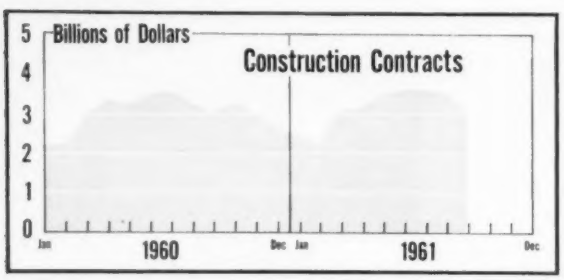
But there is a nagging restraint in the forecasts of most economists and businessmen. Cautious eyes are cocked on consumer buying. The real cue to a sustained high level is in the strength of end product demand.

To judge future levels, keep an eye on retail sales, housing starts, instalment debt and surveys on consumer attitudes.

Construction Contracts Slip

Contracts for future construction valued at $3 billion were signed in September. This is 4 pct below the value of contracts signed in the same month last year. Residential building contracts rose 8 pct for the month to $1.4 billion.

Non-residential and heavy engineering building contracts were off 12 pct and 11 pct, respectively. Non-residential contracts totaled $1 billion, and heavy engineering, $600 million.



Sharp gains in apartment building accounted for most of the gain in residential construction in September. But single-family housing also scored gains.

European Market Is Measured

U. S. businessmen last week got an exciting, authoritative look at a vast potential market for their products. This happened when the Twentieth Century Fund reported on a 5-year study of Western Europe economy.

Nutshell conclusion: There is a bigger-than-realized market there for most of the goods that U. S. industry is adept at producing. And the market is growing.

Says Dr. J. F. Dewhurst, who directed the 18-nation study; "Their rate of advance has been better than anything the U. S. has achieved as far back as our records go."

The report projects the W. European economy through the 1960's.

Durables Stocks Rise Further

September marked the third straight month that durable goods inventories have climbed. Stocks rose to

$31.09 billion, up almost $300 million over August.

The inventory rise is significant for two reasons:

The rise is based on increases in sales and production. Little or no stock accumulation has been prompted by inflation fears or threatened shortages.

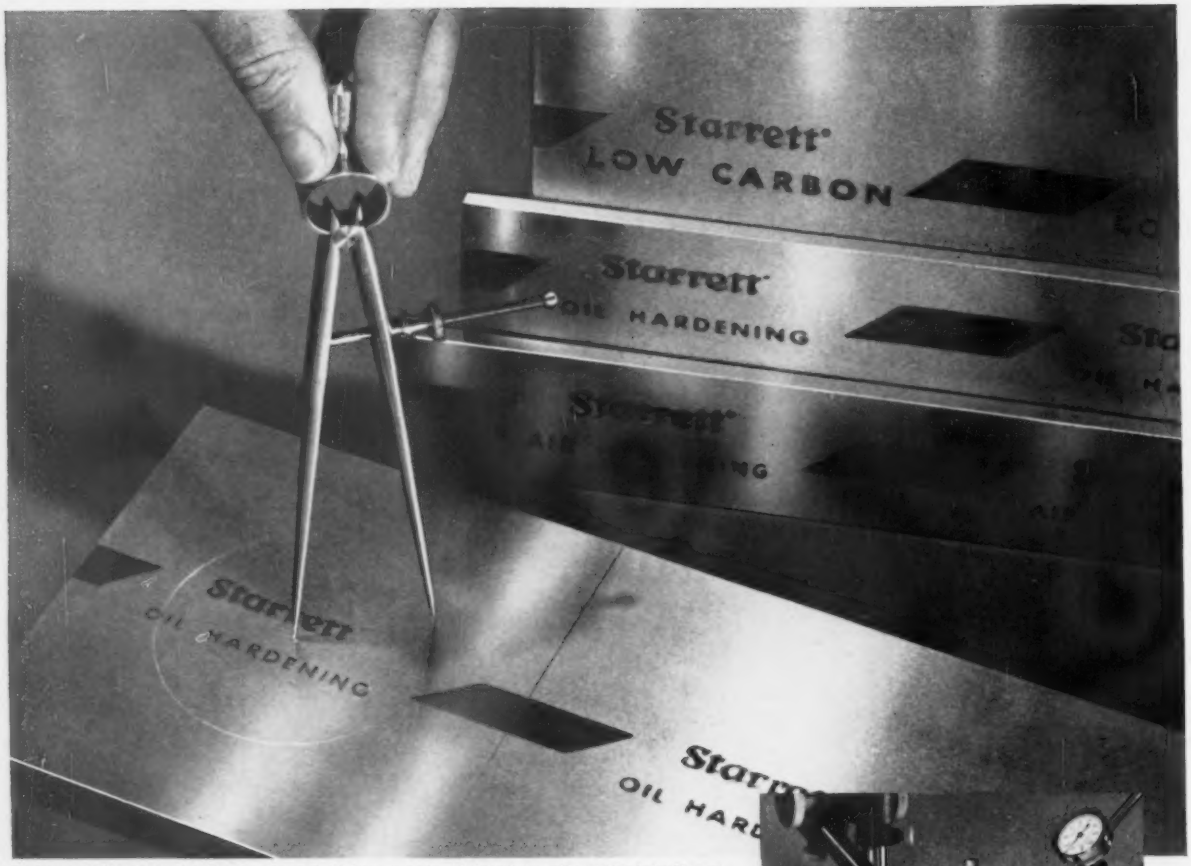
Also, about two-thirds of the increase in stocks for the month was accounted for by increases in purchased materials. This indicates that new orders received by manufacturers are spurring fresh buying.

New Look: Prices and Profits

Most of the speculation on the business scene now is on prices. While there is little fear of runaway inflation, there is fear of creeping prices.

So far, only the "front line" of prices is under attack. Costs for "extras" are being passed on. And in some cases, special discounts are being dropped. And some purchasing men report they are being asked to absorb shipping costs.

But when most actual price hikes come—about the first quarter of 1962—they will be nominal ones. In each recent recovery, as one economist has pointed out, prices have advanced less and less. Industry pricing umbrellas that allow marginal producers to make money are disappearing. In the coming period, profits, more than ever, will go to the efficient.



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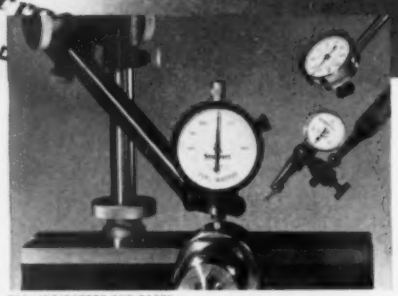
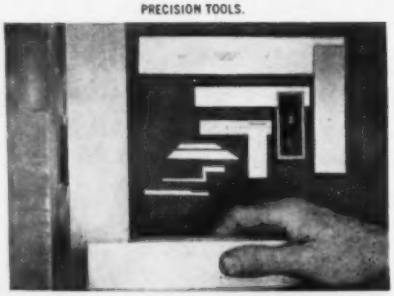
World's Greatest Toolmakers



DIAL INDICATORS AND GAGES

HACKSAWS, HOLE SAWS, BAND SAWS, BAND KNIVES

PRECISION TOOLS.



Teamsters: It's "No" In Cincinnati

For a short moment, the milkdrivers in Cincinnati hold the center of the labor stage. There may be a time when rebellion against the Teamsters and James Hoffa becomes routine news. But not yet.

Last week, in Cincinnati one group of milkdrivers of Local 98 voted by an overwhelming 1664-to-12 majority to leave the Teamsters and go to the AFL-CIO. And an AFL-CIO charter is waiting for them as soon as the NLRB certifies the election to leave the Teamsters.

There is still to be another election involving other members of Local 98 who have already voted, by voice vote, to leave the Teamsters. Unofficial count would bring the defection to about 4000.

An Important Tool For Negotiation

Too often, management teams will plunge headlong into critical labor negotiations without knowledge of precedents and patterns that have been established.

A case can be made that settlement by one company does not have to dictate the settlements of another. But, the labor side is generally well informed of precedents that have been set. Lack of this knowledge frequently puts management at a disadvantage.

For this reason, a new series of studies of labor agreements to be issued by the Dept. of Labor can be a valuable tool in labor negotiations. It won't be ready right away, but the Dept. of Labor will have its first analysis ready in about three years.

Some of the provisions:

1. The bargaining unit, terms of contracts, reopening provisions; 2. Union security, checkoff; 3. Union and management functions, rights, and responsibilities; 4. Union-management cooperation, technological change, automation; 5. Strikes and lockouts, contract enforcement; 6. General wage provisions.

7. Wage adjustment plans; 8. Wage setting procedures; 9. Hours of work, premium pay; 10. Pay or work guarantees; 11. Dismissal and layoff pay; 12. Paid vacations and holidays; 13. Health and insurance.

14. Pension plans; 15. Profit sharing, bonus, stock-option, thrift plans; 16. Leave of absence; 17. Inplant time allowances; 18. Hiring, promotion, transfer, etc.; 19. Layoff and recall; 20. Safety, health and sanitation; 21. Plant committees; 22. Work and shop rules; 23 Grievance procedures; 24. Arbitration; 25. Discipline and discharge; 26. Apprentices; 27. Attention to special groups.

Unemployment Less Severe

A look at geographical changes in unemployment gives some insight into changes going on in the economy.

In the early fall, the big changes that can be noted city-by-city pulled a few areas from a higher degree of unemployment into a less severe rate of joblessness.

For example, the Dept. of Labor notes that Baltimore, St. Louis, Seattle, and Flint, Mich., pulled out of the category of "substantial unemployment" to "moderate employment." **This means from an unemployment rate of from 9 to 11.9 pct of the workforce to from 6 to 8.9 pct.**

Here are the factors that resulted in the improvement:

Baltimore: Factory gains centered mainly in important local shipbuilding, steel, and food products. Pickups in trade, service and government employment also helped reduce unemployment.

Flint: Recalls in dominant autos and related suppliers were mainly responsible in cutting local joblessness in this auto-related city.

St. Louis: Gains were noted in fabricated metals, steel, electrical and non-electrical machinery. Textiles, apparel, and chemicals helped.

Seattle: Increases in transportation equipment, principally aircraft and shipbuilding, aided in the improvement.

Within the area of **substantial unemployment,** South Bend, Ind.: Muskegon, Mich.; and Buffalo showed an improvement, **but only to a degree. Here again, primary metals, automotive,** paced the upturn, but **failed to pull these hard-hit cities** out of the category of **9 to 11.9 pct** of the workforce unemployed.

For the record, here are some of the other metalworking centers that remain in the "substantial unemployment" class:

Birmingham, Ala.; Bridgeport, New Britain, and Waterbury, Conn.; Evansville, Terre Haute, Ind.; Louisville, Ky.; Springfield and Worcester, Mass.; Battle Creek, Detroit, Saginaw, Mich.; Akron, Canton, Hamilton-Middletown, Lorain-Elyria; Toledo, and Youngstown-Warren, Ohio.

Philadelphia, Pittsburgh, Altoona, and several other Pennsylvania cities.

REMEMBER WHEN . . .

Doing The Job Fast Was Essential?

(AND DOING IT RIGHT WAS NECESSARY, TOO!)

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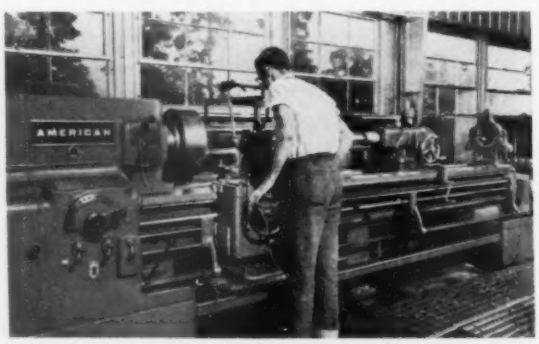
For example, take Brown Oil Tool, Inc. of Houston, Texas . . .

A leading manufacturer of oil well completion equipment, Brown Oil Tool had a bottleneck in the production of hydraulically set retrievable packers from Timken seamless tubing. Releasing stems were slow to produce because of the complex shape and close tolerances required. Switching to an American Modulated Feed Tracer Lathe reduced machining time 750%! Handling plunge tracing as well as steps and shoulders, Brown's American lathe consistently holds a template-to-workpiece tolerance of 0.0005". According to Mr. Joe R. Brown, Vice President in Charge of Manufacturing, machining time on these packers was reduced from 2½ hours to 20 minutes floor to floor . . . and Brown Oil Tool has shown an across-the-board production increase of 50% on *all* jobs run on their American Modulated Feed Tracer Lathe.

If you would like *your* jobs done fast . . . and right . . . contact your American distributor. Or write to us for descriptive bulletins.



A leader in oil well production tools for a quarter century, Brown Oil Tool, Inc. uses an American Modulated Feed Tracer Lathe to produce precision hydraulic packers.

THE AMERICAN TOOL WORKS COMPANY

PEARL STREET AT EGGLESTON AVENUE • CINCINNATI 2, OHIO

By R. W. Crosby

★ Is Tax Hike Inevitable?

President Kennedy's plans for budget-balancing may lead to higher taxes, despite his statements to the contrary.

The President's hopes to swing abruptly this year's $7 billion deficit to a balanced budget without tax increases is called "wishful thinking" in some Washington quarters.

President Kennedy's balanced budget for fiscal 1963, he says, depends on the economic recovery of private enterprise. The President's Budget Director, David Bell, says the Administration is expecting economic recovery to produce $10 billion more federal income next year through extra tax revenues.

But a slower rate of recovery than expected would throw the Administration's plans awry. For one thing, the Administration expects industry to sell more while the government is buying less. Cuts in nondefense spending are being made. And the Pentagon is tightening its spending belt in some areas.

For instance, the decision not to spend the $780 million Congress voted for the B-52 and B-70 bombers.

If the economy doesn't recover at the expected rate, a tax increase seems to be the most likely budget balancer. Despite statements from the President and some of his aides that taxes are high enough now, they are ready to resort to it.

Budget Director Bell states plainly that if more federal income is needed to balance the budget, Congress will be asked to raise taxes. Bell says, "We hope we can present a balanced budget without asking for significant new tax legislation, but we don't know whether it will be feasible."

A tax increase would undoubtedly hit businessmen the hardest.

■ Aluminum Antitrust Probe Is Shelved

The rumored big antitrust investigation of the aluminum industry turned out to be a small "fishing expedition." Sen. Estes Kefauver's Senate Antitrust Subcommittee has dropped the probe after a quick look at the industry.

The investigation was a routine check to see if a full-scale investigation was warranted. Investigators found it wasn't—at the present time. The cursory probe was made in answer to complaints about the aluminum industry pricing procedures received by Sen. Kefauver.

First reports were that 20 aluminum firms had been subpoenaed in the investigation. It now turns out that no subpoenas were issued. Only a handful of letters went to aluminum companies. The investigators did visit some firms, but they found nothing to warrant a big probe.

The committee, tied up with a hopper full of antitrust matters, has filed the aluminum matter away. However, it is readily available for future reference.

■ CD To Seek Billion For Public Shelters

Serious study is being given a proposal calling for a billion dollars to start building public bomb shelters. Federal Civil Defense officials have decided to ask President Kennedy to back such a program.

The proposal may go to Congress next year. It would stir a controversy among the legislators. There have been similar recommendations in the past, and they have been soundly beaten.

However, recent pressure from local governments and the public in general may change some opponent's minds.

■ New Agency To Study Effects of Disarmament

The question of what happens to industries relying heavily on defense weapons contracts will be answered by the new U. S. Arms Control and Disarmament Agency.

Set up by Congress this year, the Agency will delve into the economic consequences of disarmament and arms control. The question is of prime importance to defense contractors, despite its abstract nature in the present cold war.

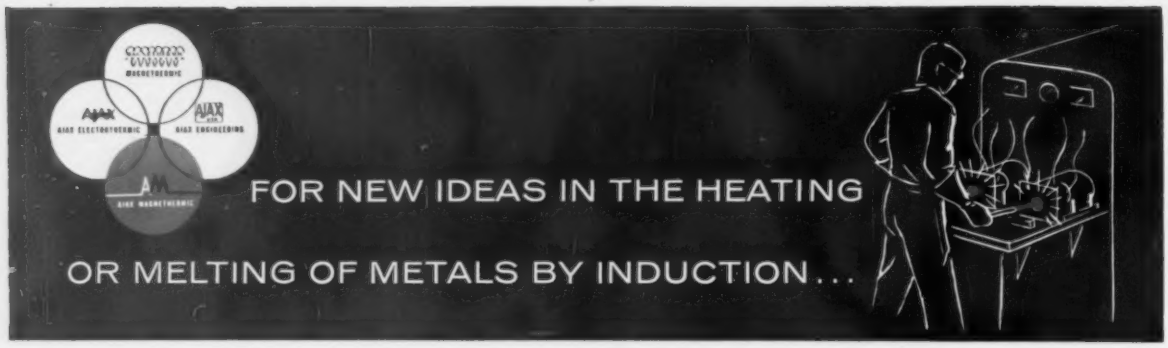
The Agency will conduct studies on readjustment of industry and reallocation of national resources if weapons are taken out of production.

■ SBA Approves Initial Foreign Business Pool

The Small Business Administration (SBA) has approved the first small business pool which will compete against larger manufacturers for government contracts.

Composed of four small firms in the New York City area, the pool will try to obtain research and development contracts for large-scale defense systems.

By pooling their resources, says SBA, the four firms are in a better competitive position to bid on government prime contracts than they would be as individual small contractors. While acting within the scope of the approved SBA program, the pool is exempt from antitrust laws.



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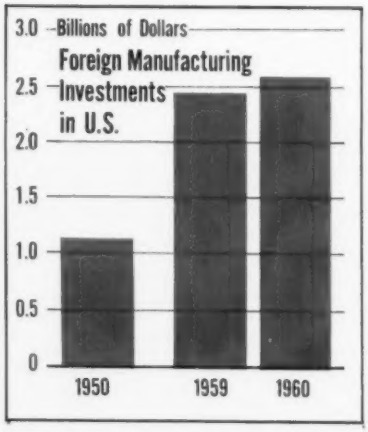
Automatic Heating by Induction for forging an automotive part.

Foreign Investments Climb Again in U. S.

Foreign business investments in the U. S. continue to climb, with a book value of $6.9 billion this year. This is double the investments of $3.4 billion in 1950 when the last Dept. of Commerce survey was made.



Foreign investors also have extensive portfolio holdings in U. S. corporate stocks, with an estimated value of $9.3 billion now. Combined foreign investment in the U. S. now totals $16 billion.

Over one-third of the foreign investment is in manufacturing companies. The $2.6 billion in manufacturing is a greater proportion of the 1961 total than the $1.1 billion in 1950.

England holds the greatest share of foreign direct investments in the U. S. With $2.2 billion, it controls one-third of the total. Canadian direct investments are the next largest, with $1.9 billion.

W. Germans May Buy Krupp Steel Empire

The knotty problem of breaking up Germany's huge Krupp steel and coal empire may be solved by selling it—to the people.

Western powers handling the Krupp case are reported favoring the idea of creating "people's stock" in Krupp, for public purchase. The plan would be similar to that which denationalized Volkswagen's automotive plants.

A commission of English, French, U. S., and West German experts is studying this latest proposal. It has been deadlocked ever since its formation in 1953. Then, Alfried Krupp's billion-dollar industrial empire (Europe's largest) was restored to his sole ownership on condition that he dispose of all steelmaking operations by 1958.

When the 1958 deadline expired, Krupp claimed he had been unable to find a buyer for any of his steelmaking properties at a reasonable price. The commission has allowed Krupp to retain his steel industry under a series of year-to-year extensions of the 1953 agreement.

Western powers have refused to rescind the 1953 agreement. And West Germany has refused to approve action forcing the sale. The Bonn government's "people's stock" scheme could be the answer.

Business Machine Exports Soar

Exports of U. S. business machines jumped 64 pct in the first half of 1961. Electronic computers and related equipment were the leading commodities with exports of $53.2 million, compared with $17 million in the first half, 1960.

Total business machine exports reached $155 million, compared with $94 million in 1960. U. S. imports of business machines in the first half went up to $47 million.

Canada remains the biggest buyer of U. S. business machines. It took 18 pct of the total exported, or $28 million. Japan was a close second, buying 14 pct of the total exports.

Japanese Steelmaker Eyes U. S. Market

As U. S.-Japanese government leaders met in Tokyo last week to strengthen relations between the countries, a top Japanese steelmaker arrived in th U. S.

Shige Kawata, president of Nippon Kokan (Japan Steel & Tube Corp.), flew here to sign a $6.5 million loan by the Export-Import Bank at Washington. With another $3 million loan from First National City Bank of New York, Nippon Kokan will build its new Mizue Iron Works. It will include a tinning mill, purchased from Wean Engineering Co., Inc., Warren, O.

"We hope to expand our market in the U. S.," Mr. Kawata told The IRON AGE. The third largest Japanese steelmaker figures to spend $1 billion on expansion in the next decade. Aim is 7 million-ton capacity by 1970.

KAWATA: Boost for Nippon.

Nippon Kokan has two reasons for its planned push in the U. S. market: It is buying much new heavy equipment here; and, it hopes to get 20 pct of its $1 billion expansion finances from Eximbank. It will need U. S. dollars to pay the bills of borrowing and building.

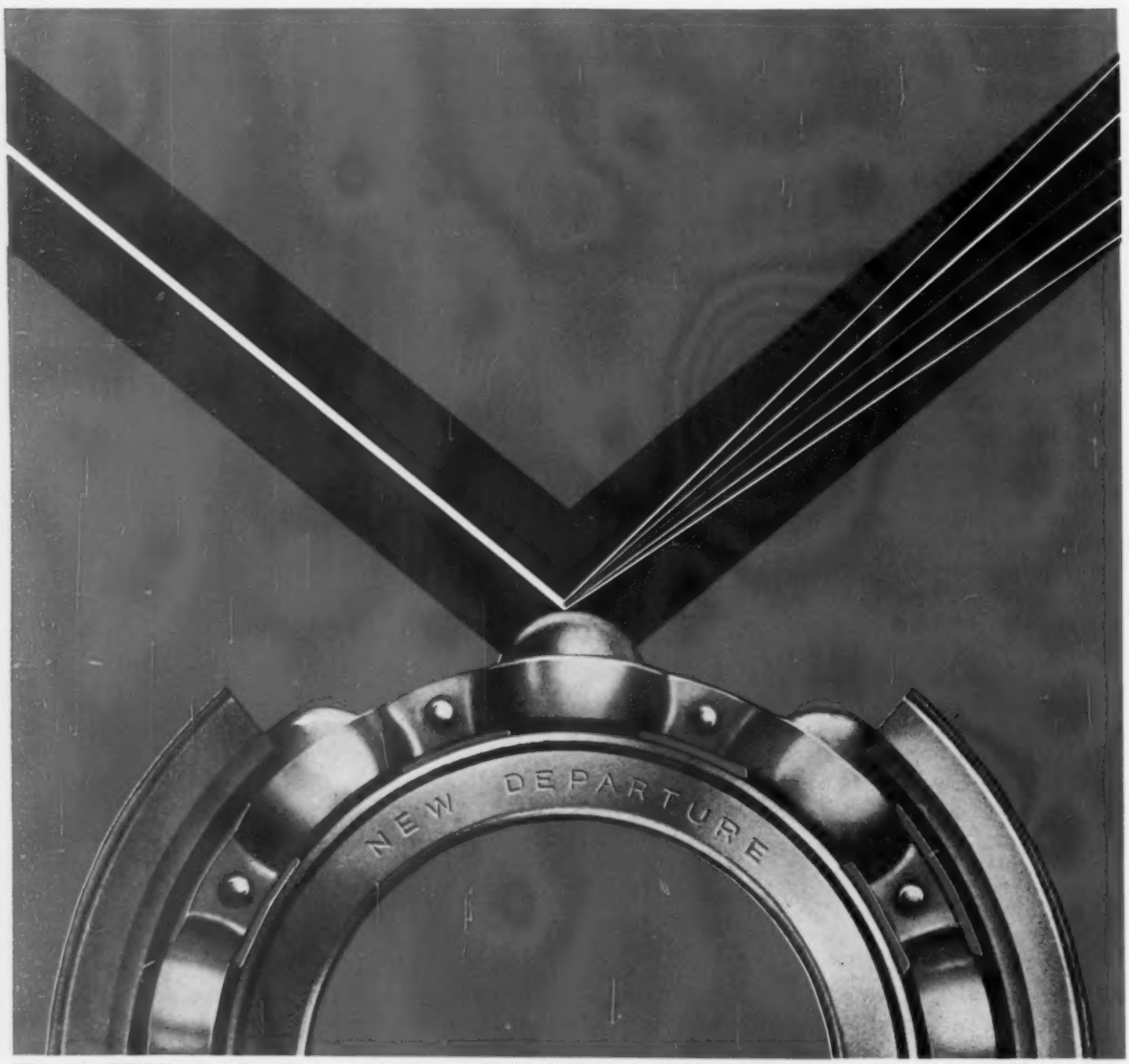
NONDESTRUCTIVE INSPECTION DEVICES SEEK OUT MINUTE FLAWS

—help New Departure make better bearings!

One such device is *the N/D Ball Scanner*. As eagle-eyed instruments, they subject balls coming down the lines to the closest scrutiny. With unfailing consistency, they automatically reject balls having the minutest traces of rust, pits, grind marks, blemishes, and other faults, normally undetected by visual inspection. Result—balls made by New Departure are more defect-free than ever before. Bearings assembled with these balls and used in your products deliver better performance with greater reliability.

Development of nondestructive inspection devices has long been one of New Departure's principal R & D efforts. The Ball Scanner is just one of the existing devices that are already bringing you higher quality and more reliable bearings. Others are still under "wraps," but are destined to bring you even better bearings in the near future.

The advantages of these ball bearings are available to you now. Contact the New Departure Sales Engineer in your area. New Departure, Division of General Motors Corporation, Bristol, Connecticut.



NEW DEPARTURE

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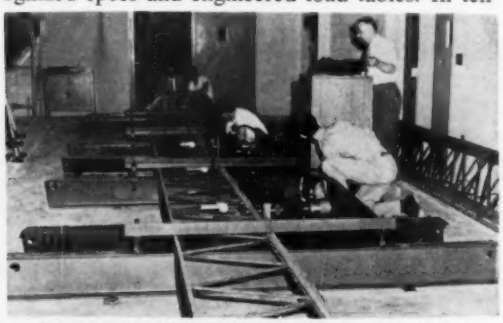
New Steel Joist Standards

New standards from the Steel Joist Institute will result in two completely new series of open-web steel joists. Designers will work with recognized specs and engineered load tables. In tension, the design stress for series "J" is 22,000 psi. For series "H" joists it's 30,000 psi. Institute manufacturers plan to have joists in both series available for structural jobs by January, 1962.



DEFLECTION TESTS: Check 48-ft. joist.

Thermal Shock Effects

Thermal shock waves may cause mechanical resonance in metal alloys. The result: Premature failure. This is the gist of a preliminary Air Force report which urges further study of ultra-short time creep rupture. In the initial tests, sheets of HM-21, H-11 and Type 310 stainless were studied. Thermal shock was imposed at temperatures up to 3000°F. To simulate atmosphere reentry conditions, this peak temperature was achieved within 200 milliseconds.

Russians Coat Stainless

Soviet metallurgists have coated stainless steel with a thin protective film which shows hardness, high heat resistance (above 500°C) and corrosion resistance. It's formed by applying cracked ammonia for 56 hours at 560°C.

Trend to Extrusions

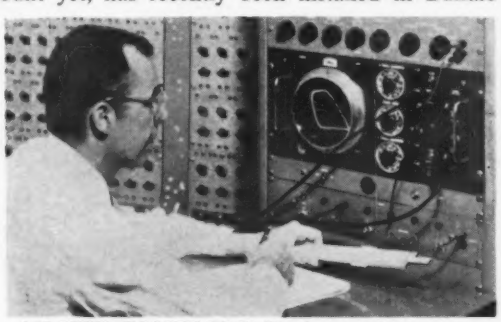
In some consumer product fields, advanced tooling and assembly methods for extruded components are boosting the popularity of the extrusion process with designers. Press forming, combined with staking, crimping and other simple production techniques, provides a variety of low-cost designs. This helps engineers to meet the demands of today's custom-styled products. Tooling can be kept inexpensive, yet flexible.

New Use for Cobalt 60

One potentially important use of nuclear wastes is being explored by the Goodyear Tire & Rubber Co. It centers on vulcanizing rubber by radiation from man-made Cobalt 60. Principal drawback at the present time is cost. But the company says it will be in position to take advantage of the great quantities of cheap fission wastes which should be available in the nuclear-powered economy of the future.

Checks Compressor Design

An electronic computer which can study the performance of machines that haven't even been built yet, has recently been installed in Buffalo at the Worthington Corp. Initially, it's being used to evaluate different designs for compressors used in natural gas pipelines.



AT THE CONTROLS: Engineer sets up tests.

Malleable Iron Projectile

Just announced is a new R & D contract for production engineering of a 105-mm, high-explosive projectile. Pearlitic malleable iron will get the nod as the main-body casting material. It shows excellent fragmentation behavior. It's also on the non-critical list. However, the clincher in the choice of pearlitic malleable is an expected cost advantage over conventional cast steel.

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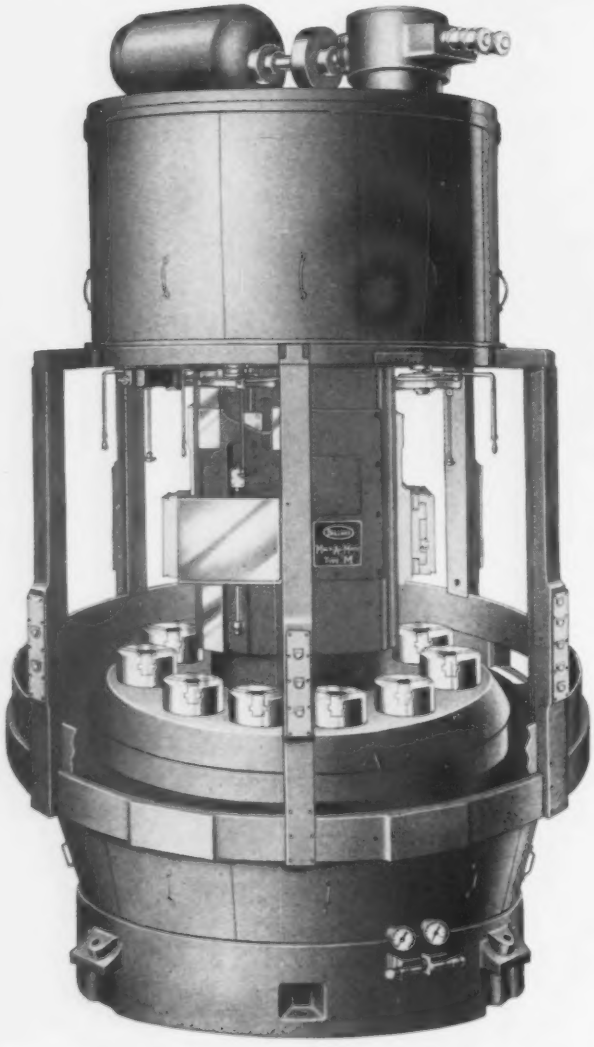

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Survival? It could depend on a 3,000-mile picket fence

Ever-vigilant sentinels against surprise attack are the radar installations along the DEW Line. Stretching 3,000 miles across Canada and Alaska, this electronic fence is our first line of defense.

At bleak, lonely outposts Air Force and civilian technicians watch for tell-tale blips on radarscopes—Distant Early Warning of the possible approach of enemy aircraft or missiles.

This all-weather system must withstand the worst of the elements—sub-zero temperatures, high velocity winds, rain, snow and ice storms common to the Far North. And dependability of the equipment could determine whether or not we survive an attack.

There are numerous applications for specialty steels made by Jessop Steel Company in DEW Line installations. For example, forging quality alloys and wear-resistant tool steels for the gear mechanism of a rotating surveillance radar; cast-to-shape steel for certain other component parts and precision ground steels for delicate instrumentation.

Jessop is keenly aware of the importance of built-in dependability in the steelmaking process—whether meeting specifications for steel to be used in the nuclear reactor of a Polaris-firing submarine; a Redstone missile to launch an astronaut; an earth-girdling satellite; or a DEW Line radar installation.

Yes, for dependability, you can rely on Jessop . . . the *big* name in specialty steel.

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let's evaluate our carbides in terms of your needs

Answers to some of your materials needs may be developed in a talk with a Kennametal Carbide Engineer—which could lead to considerable savings for your company. He is specially trained and *devotes his time exclusively* to the application of Kennametal* hard carbide alloys.

A special series of Kennametal tungsten carbides provide corrosion resistance near that of noble metals and wear resistance greater than these expensive metals. Other outstanding properties of these Kennametal compositions are high hardness; high torsional, compressive, and tensile strengths; and high resistance to impact, abrasion, and heat.

Expanding use of Kennametal tungsten and titanium carbides in many industries is indicated by these applications:

1 Seal rings of Kennametal successfully control liquid oxygen and red fuming nitric acid used in rockets. Exposed to temperatures of 300°F, under pressures up to 80 psi, and rotating speeds of 17,500 rpm, the material previously used lasted only 120 minutes. Kennametal rings function over much longer periods without measurable seal face wear or leakage.

2 Needle valve, having solid Kennametal cone and ring, is used as pressure regulator in recovery of catalyst chemicals from exhaust gases—with temperatures reaching 1100°F and pressure differential of 215 psi. Kennametal cone weighs 57 pounds and ring weighs 28 pounds.

3 Kennametal unloader knives or scrapers, on a crystal dehydrator, increased service life to 12 months in processing highly corrosive ammonium sulfate, and to 4 months processing synthetic sulfate—a service ratio of 4 to 1, in each process, compared with knives previously used.

4 Ball and seat valves, made of both Kennametal and Kentanium, have operated successfully for years under severe conditions in oil well pumps, hydraulic systems and chemical processing equipment. They withstand abrasion, deformation, cavitation, high temperature and attack by corrosive agents up to 100 times longer than the hardest ferrous alloys.

5 Kennametal components in valves withstand effect of moving solid-fluid dispersion materials through valves at 646 miles per hour.

Kennametal properties, plus our creative research and development activities are helping to translate ideas into products that combine reliability with long service. And some of these ideas and products may be the most productive answers to your requirements. ●

For more complete information call your nearest Kennametal Representative—or write for Booklet 666, "Proven Uses of Kennametal and Kentanium," which describes over 80 successful applications of these carbide alloys. KENNAMETAL INC., Dept. IA, Latrobe, Pennsylvania.

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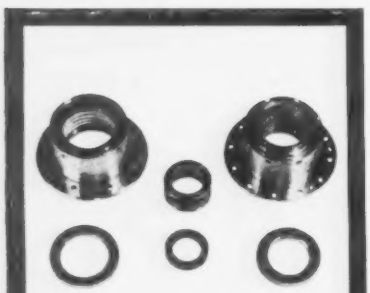
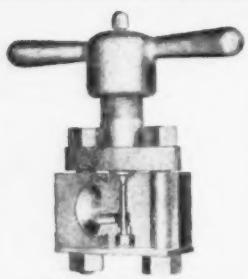


1. SEAL RINGS

4. BALL AND SEAT VALVES

2. VALVE CONE AND RING

3. DEHYDRATOR SCRAPERS



5. VALVE COMPONENTS

LETTERS FROM READERS

Public Service

Sir—We would like to receive copies of your very excellent editorial, "Foot-in-Mouth Disease: We Can Do With a Little Less" (IA, Oct. 12).

Your weekly comments on the national and international scenes are read with a great deal of interest here. We feel you are doing a much-needed public service to your subscribers in bringing these matters to their attention.

Keep up the good editorial job you've been doing.—R. C. Perpall, vice president, The LaFleur Corp., Torrance, Calif.

Sir—I just want you to know that I think you are doing a real good job in your weekly editorials. —Gordon R. Walker, president, Walker Forge Inc., Racine, Wis.

Metal Forming

Sir—I was very much interested in your informative article on forming of metals. I would like to receive a reprint of this and the three earlier articles.—T. H. Bloodworth, chief systems engineer, Industrial Systems Dept., Allis-Chalmers Manufacturing Co., Milwaukee.

Sir—Congratulations on the excellent article on Metalworking's Technological Explosion in your Oct. 12 issue. I would appreciate a reprint.—C. J. Sawey, senior mfg. research engineer, Convair, Ft. Worth, Texas.

Sir—Your series on the technological explosion in metalworking is must reading for everyone in this and related fields. Your kindness in sending me reprints will be appreciated.—S. W. Meyer, contract manager, Koppers Co., Inc., Engineering and Construction Div., Pittsburgh.

Coremaking

▪ Two articles in the October 19 issue of IRON AGE have produced a number of requests for reprints. Here are just a few of the requests received for copies of "Open-Coil Process Makes Bid for Stainless Market" and "How Coremaking Puts Precision Into New Cast Iron Engine":

Sir—We have read with much interest your feature article, "Open Coil Process Makes Bid for Stainless Market." Please let us have reprints.—R. Scheer-Hennings, Stahlunion Corp., New York City.

Sir—I would appreciate your forwarding me a reprint (of the open-coil process article).—K. E. Shaweker, Allegheny Ludlum Steel Corp., Pittsburgh, Pa.

Double Order

Sir—May we have reprints of two articles in the Oct. 12 issue? They are "How Military Will Buy Hardware" (p. 129) and "Order Copper by the Numbers" (p. 168).—Rosamond Cruikshank, technical librarian, Portsmouth Naval Shipyard, Portsmouth, N. H.

"Check up on him. I think he's running a mail order business on the side."

think again

If you think that fasteners are "chicken feed", think again. Your costs mount up when you use faulty fasteners that slow down and stop assembly operations, or cause damage to materials and tools.

Why not buy quality fasteners in the first place, and then your fastener costs will really be "chicken feed".

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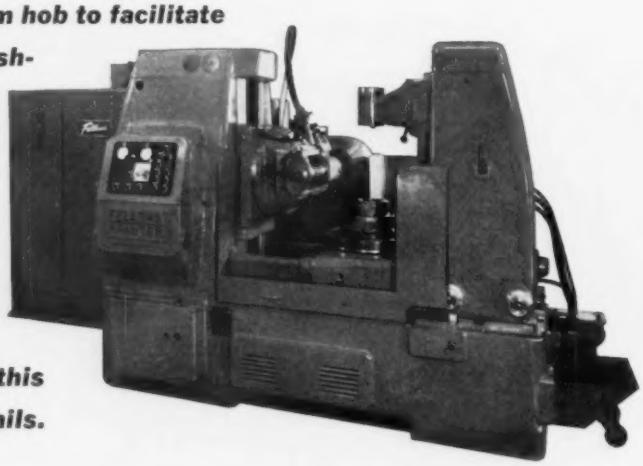
You get all the advanced-design features of the production-proved P 400 Fellows-Pfauter hobbing machine — plus extra work capacity — with this new Model P 630. Takes work up to 25" diameter. Maximum face width at 25" diameter is 16¼". Maximum diametral pitch in steel is 3.

Work area is readily accessible for setup and loading, and table retracts automatically from hob to facilitate work changes. Hob shifting is by push-button. It's solid too, with rugged hob head and double wall construction column and bed, and heavy V-ways. Table is as large as maximum workpiece diameter — work column of massive design.



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"Fellows-Pfauter Change Gear Tables" by F. Becher and A. Koerner eliminates tedious calculations and trial-and-error methods. Gives combinations for more than 26,000 ratios carried to six decimal places from .100,000 to 1.000,000, with greatest step approximately .00005. Gears in range of 18 to 80 teeth mainly used. Examples are given. Only $8.00. Order from THE FELLOWS GEAR SHAPER COMPANY, 78 River St., Springfield, Vermont, U.S.A.

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Gear Production Equipment

Editor at Work

If there is any single area where we concentrate our interest, it is our cover picture. We know it's important to us, as editors. But we also want to have a picture that will draw your interest and lead you into the magazine.

This week's cover picture was taken on the test track of the International Harvester Co. at Ft. Wayne, Ind. The story, written by Cleveland Editor Tom Rohan, tells about the problems truck engineers are solving in cutting weight, saving fuel, increasing truck life, and all the other elements that are vital in truck manufacture.

General Applications — Some of these things can be applied to other areas of metalworking where the problems are similar to those of the truck makers. Use of new materials, for example, is of general interest in metalworking and goes beyond the narrow area of truck engineering.

But going back to the picture, we don't just ask someone to take a few pictures for us and then sit back and wait. Our editors assigned to the cover story go right along with the photographer and assist in lining up the type of picture we think will do the job.

Proof? In the picture here, you'll see our editor, Tom Rohan, right on the job at the International Harvester track. And, we hope you'll turn to p. 79 and find out what he learned from International Harvester and other truck makers about progress in truck engineering.

What's Going On—If you'd like to know what they are doing in the picture, engineers are working at the "twist course," which is part of the track and, as the name applies, puts the truck through severe torsion. Engineers here look especially at door binding, throttle and other linkages, brakes, tires rubbing, axle clearances and similar features.

IN THE PICTURE: Cleveland editor T. M. Rohan (center) steps into the picture at International Harvester test track where truck engineers are hard at work improving performance and payload for the highway giants.

WHAT DO THESE ITEMS HAVE IN COMMON?

All are rushed to destinations by Delta Air Freight; get nationwide overnight right-to-the-door delivery. Thousands of commodities speed daily with Delta dependability. For *your* next shipment, check how little by Delta — always faster, often cheaper.

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100 lbs. Los Angeles to Canaveral $29.85
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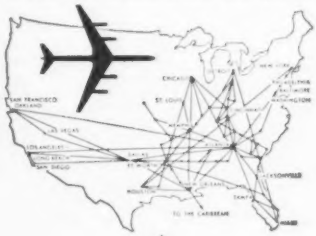


DELTA

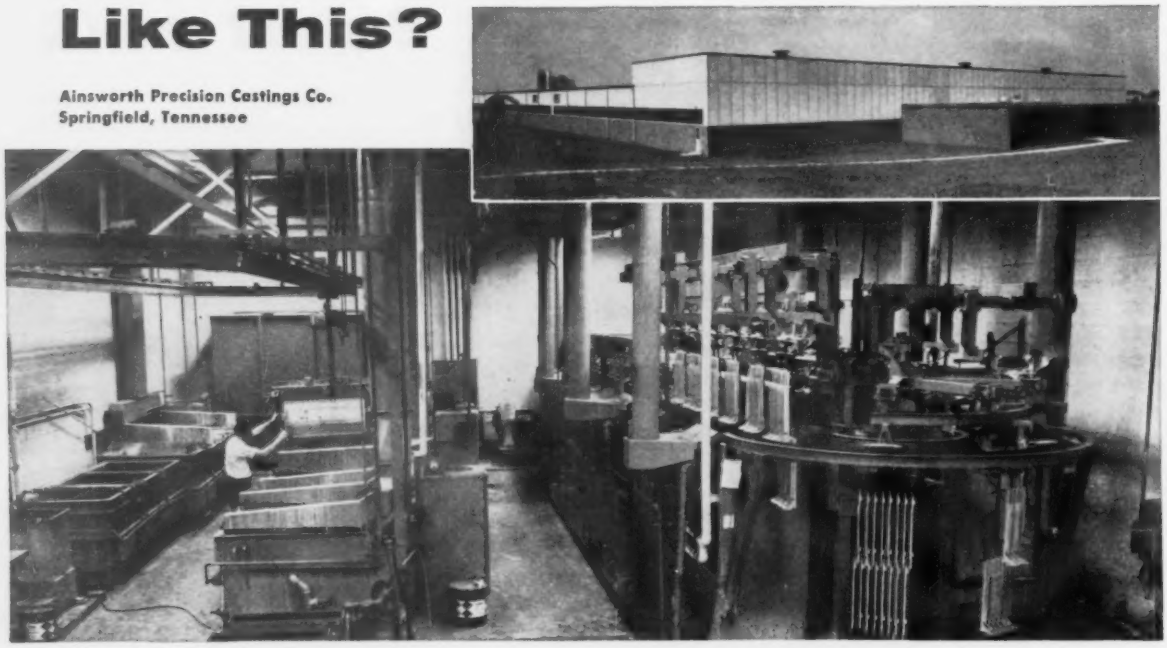
the air line with the BIG JETS

GENERAL OFFICES: ATLANTA, GEORGIA.

LOOK FOR THE DIAMONDS—SIGN OF FINISHING QUALITY

Can You Use Process Engineering Service Like This?

Ainsworth Precision Castings Co.
Springfield, Tennessee



Complete system for Zinc plating and Iridite—designed, fabricated, installed and serviced by Allied Research to turn out auto window channels, gear shift and directional signal components.

Here's what Allied Research did to give Ainsworth "Turn Key" service:

1. Planned the entire layout and operational details.
2. Recommended and presented complete cost analysis of processes, equipment and supplies necessary . . . and furnished them.
3. Reconditioned existing equipment and integrated it with new equipment to make the installation both economical and efficient.
4. Planned and constructed a complete waste disposal system for treating cyanide wastes.
5. Installed 14-station zinc-IRIDITE automatic, 12-station zinc barrel line, and a still line.
6. Set up procedures for regular qualitative testing of coatings and solutions.
7. Executed an extensive training program for operators.
8. Entire operation completed ahead of schedule even though overall construction was badly delayed by weather . . . production personnel merely turned the key, and started operations.

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Chemical and Electrochemical Processes, Anodes, Rectifiers, Equipment and Supplies for Metal Finishing

IRIDITE® Chromates | IRILAC® Coatings | ISOBRITE® Brighteners | ARP® Supplies | WAGNER Equipment

COMING EXHIBITS

Packaging Machinery Show—Nov. 7-10, Cobo Hall, Detroit. (Packaging Machinery Mfrs. Institute, 342 Madison Ave., New York 17.)

Marine Supplies & Equipment Show—Nov. 15 - 17, Hotel Roosevelt, New York City.

MEETINGS

NOVEMBER

Steel Service Center Institute—Pacific regional meeting, Nov. 11-14, Del Monte Lodge, Pebble Beach, Calif. Institute headquarters, 540 Terminal Tower, Cleveland.

Air Conditioning & Refrigeration Institute — Annual meeting, Nov. 12 - 15, The Homestead, Hot Springs, Va. Institute headquarters, 60 East 42nd St., New York.

Steel Founders' Society of America—Technical and operating conference, Nov. 13-15, Hotel Carter, Cleveland. Society headquarters, 606 Terminal Tower, Cleveland.

National Electrical Manufacturers Assn.—Annual meeting, Nov. 13-17, Traymore Hotel, Atlantic City. Assn. headquarters, 155 E. 44th St., New York.

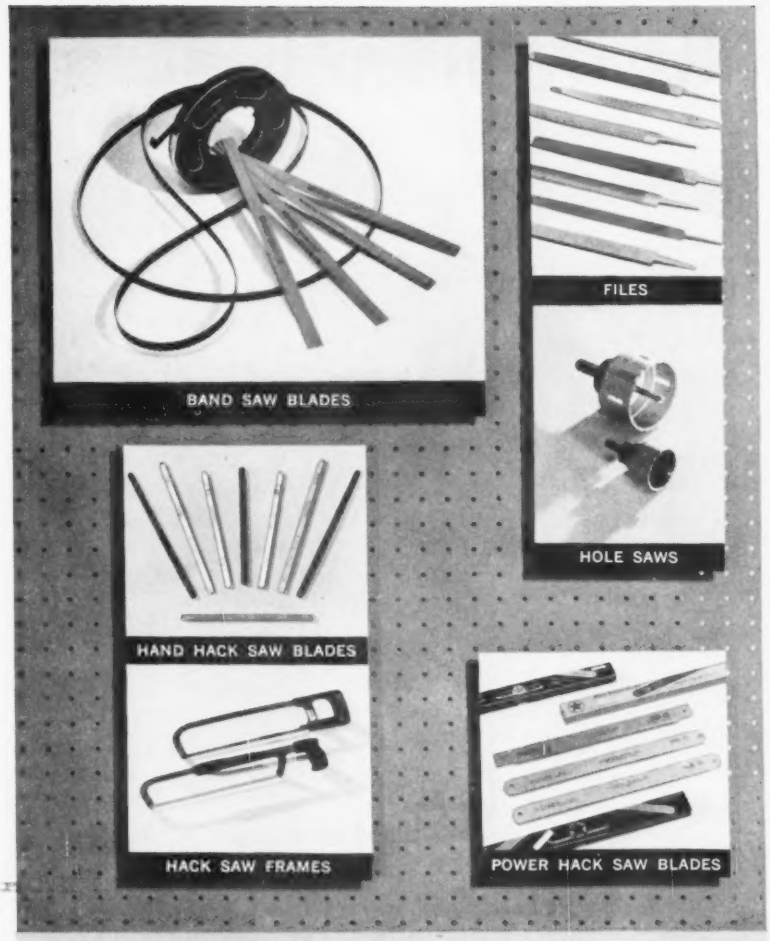
National Machine Tool Builders Assn.—Annual meeting, Nov. 14-16, Americana Hotel, Bal Harbour, Fla. Assn. headquarters 2139 Wisconsin Ave., N. W., Washington, D. C.

Society of Plastics Engineers—Regional technical conference, Nov. 15. Statler-Hilton Hotel, New York City. Society headquarters, 65 Prospect Street, Stamford Conn.

National Foundry Assn.—63rd annual meeting. Nov. 15-17, Savoy-Hilton Hotel, New York. Assn. headquarters, 4321 St. Charles Rd., Bellwood, Ill.

Society of Carbide Engineers—Annual meeting, Nov. 18, Belmont Plaza Hotel, New York City. Society headquarters, P. O. Box 45, Newington 11, Conn.

(Continued on P. 26)



CLAIMS REVISITED

Most informed buyers know that, despite all the drum beating about brand superiority in metal cutting products, all of the several top brands are amazingly close in both price and quality.

We frankly admit that Clemson Star is no exception, and therefore refuse to guarantee that Star products, though high in quality, are "cleaner cutting," "far more efficient," or "longer lasting," than all others on the market. Nor will we make any wild claims about our service or delivery being more complete or expedient than that of our most conscientious competitor. What we *do* say — and *guarantee* — is that every Star product you purchase from your local Clemson Star distributor will do *exactly* what he and we say it will do. That it will come to you at a fair price, as promptly as possible, and with the solid backing of an old, established and reputable American company, goes without saying.

The only thing that *may* be unique about Clemson Star is the absence of fantastic claims. And that's *policy!*

CLEMSON STAR

CLEMSON BROS., INC. • MIDDLETOWN, N.Y. • METAL CUTTING PRODUCTS

3028

VICE PRESIDENT-Operations

reports:

Soffel's

EXOTHERMIC SIDEBOARDS

"Give us the most flexible hot topping method we've ever known."

Use Soffel's EXOTHERMIC SIDEBOARDS in BIG END DOWN MOLDS

Of course, increased ingot *yield* is easily translated into the extra hundreds of dollars in out the door products.

Equally important, though not so obvious, are the labor-saving advantages you gain when you use Soffel's Sideboards.

Starting with the placement of the Sideboards in the mold, no crane is necessary except on the very large ingots. There's no interruption in pouring—pour straight up to the top. The ingot is single stripped, goes to the soaking pit quickly. All these steps reduce time and reflect in overall cost.

If you want more sound steel from every ingot, Soffel's Exothermic Sideboards will give it to you. Test them in your plant soon.

PRODUCT ADVANTAGES

- Eliminate permanent and conventional hot tops.
- Easy, and single, stripping of Big End Down molds.
- Sideboards are easily placed in head of mold by one man — crane only necessary on very large ingots.
- Longer mold life — less mold cost — less mold inventory to carry.

Soffel's Exothermic Sideboards increase ingot yield, assure top cut soundness and provide more ton steel out the door per ton of steel in the ingot.

Phone National 5-1571 today

Pittsburgh Metals Purifying Co.

A Division of Treesdale Laboratories, Inc.

MARS, PENNSYLVANIA

MEETINGS

(Continued from p. 25)

National Assn. of Aluminum Distributors — 11th annual convention Nov. 15-18. Arizona-Biltmore Hotel, Phoenix, Arizona. Assn. headquarters, 1900 Arch Street, Philadelphia.

American Society of Mechanical Engineers—Winter annual meeting, Nov. 26-Dec. 1, Statler-Hilton Hotel, New York. Society headquarters, 2 E. 48th Street, New York 17.

Plumbing Brass Institute—Annual meeting, Nov. 27-29. Savoy-Hilton Hotel, New York City.

American Management Assn.—Materials conference, Nov. 27 - 29, Savoy-Hilton Hotel, New York City. Assn. headquarters, 1515 Broadway, Times Square, New York 36.

American Institute of Steel Construction — Annual meeting, Nov. 27-30, Boca Raton Hotel, Boca Raton, Fla. Institute headquarters, 101 Park Ave., New York.

National Assn. of Corrosion Engineers—Regional corrosion conference of the Southeast Region, Nov. 27-Dec. 1, Key Biscayne Hotel, Miami, Fla.

DECEMBER

Malleable Founders Society — Semi-annual meeting, Dec. 1, Hotel Sheraton-Cleveland, Cleveland. Society headquarters, 781 Union Commerce Bldg., Cleveland.

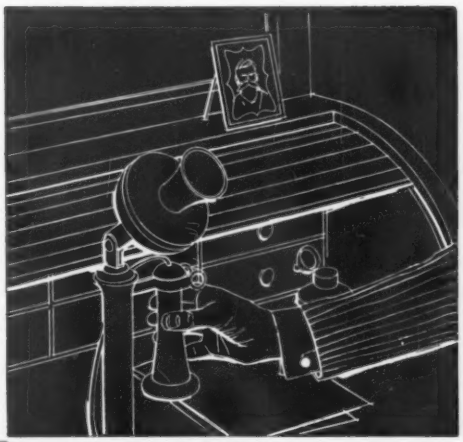
American Institute of Chemical Engineers—54th annual meeting. Dec. 3-6, Hotel Commodore, New York Institute headquarters, 25 W. 45th St., New York.

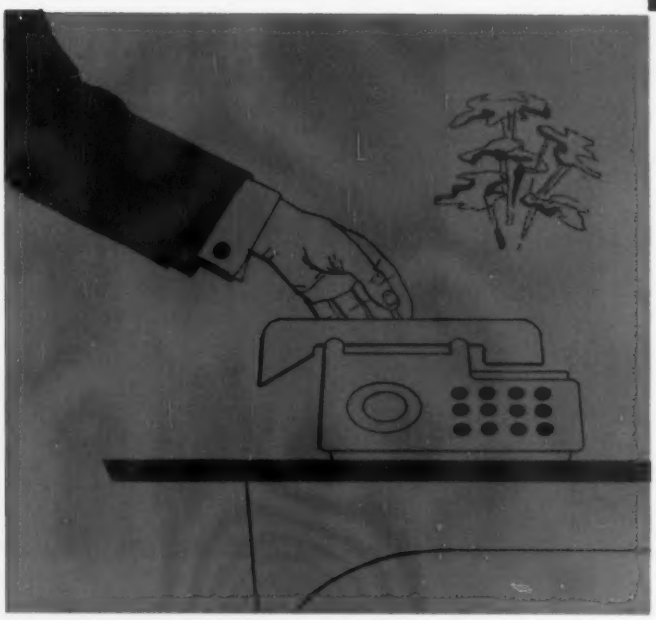
National Assn. of Manufacturers—Annual meeting, Dec. 5-7, Waldorf-Astoria Hotel, New York. Assn. headquarters, 2 E. 48th Street, New York 17.

Metallurgical Society of AIME—19th Electric furnace conference, Dec. 6-8, Penn - Sheraton Hotel, Pittsburgh.

SANDVIK QUALITY

Is Earning Its *Second* Generation of Satisfied Customers



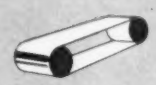


In over 40 years of tough competition, SANDVIK quality has earned, held and expanded SANDVIK'S place in American industry.

To keep old customers and to make new ones over the years, Sandvik *had to deliver superior performance, consistently.* Nothing else explains Sandvik's growth.

5 SANDVIK QUALITY PRODUCT LINES

SPECIALTY COLD ROLLED SPRING STEELS
STAINLESS WIRE AND TUBING



STEEL BELT CONVEYORS AND PROCESSING UNITS

CORONANT CARBIDE TOOLING

POWER SPRINGS

HAND SAWS AND TOOLS

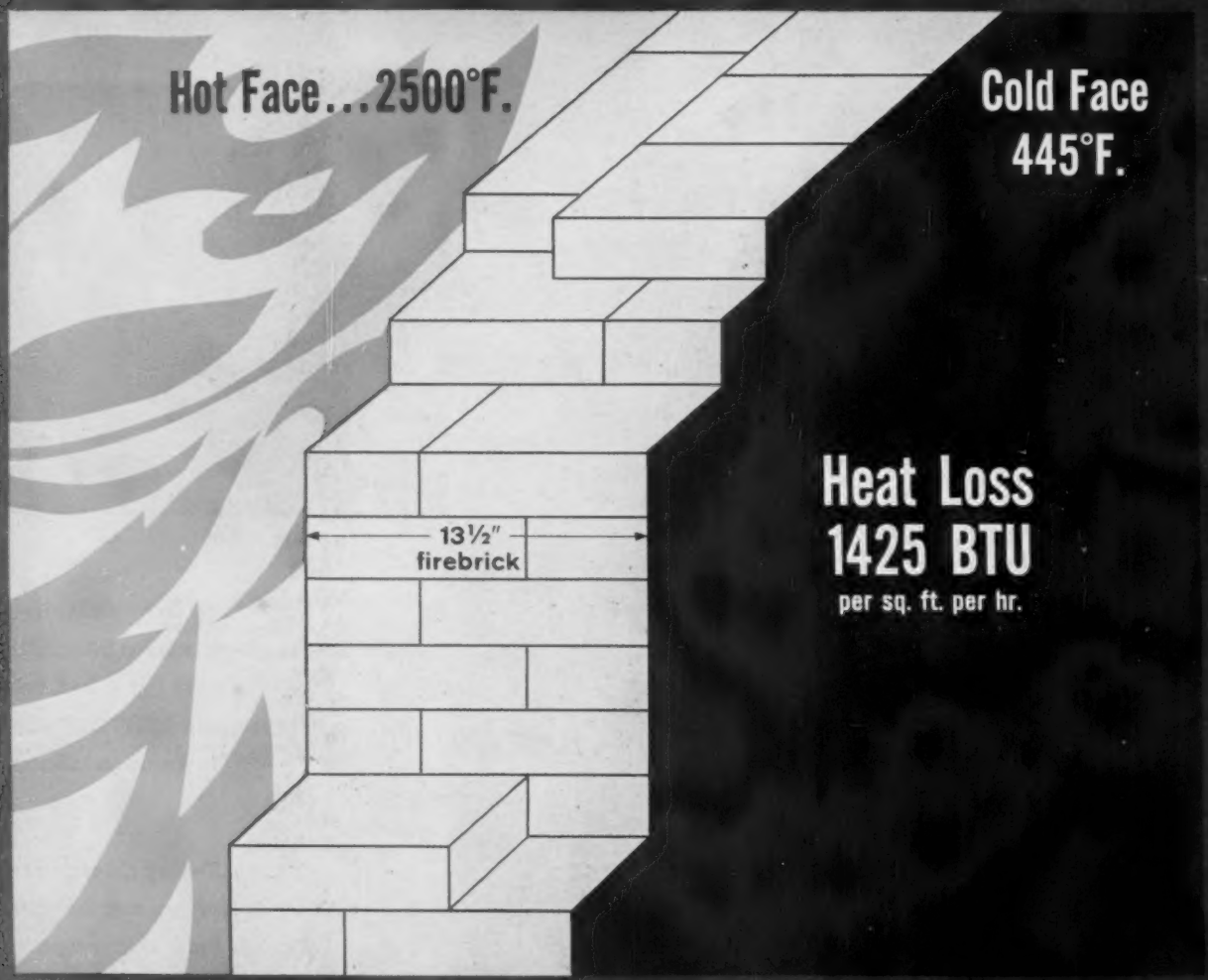
SANDVIK

SANDVIK STEEL, INC.

1702 Nevins Road, Fair Lawn, N. J. • Tel. SWarthmore 7-6200 • In N. Y. C. ALgonquin 5-2200
Branch Offices: Cleveland • Detroit • Skokie, Ill. • Los Angeles • Seattle
SANDVIK CANADIAN LTD: P. O. Drawer 1335, Sta. Montreal 9, P. Q.
Works: Sandviken, Sweden

55-237

WHY BE SATISFIED WITH THIS HEAT LOSS . . .



HARBISON-WALKER REFRACTORIES CO.

AND SUBSIDIARIES GENERAL OFFICES PITTSBURGH 22, PA.

World's Most Complete Refractories Service

FOUR REASONS WHY HW 23LI INSULATING FIREBRICK REDUCE HEAT LOSSES AND OVERALL COSTS

WHEN HW 23LI CAN REDUCE THE LOSS 59.3%

1 LIGHT WEIGHT—1.82 LB/9" EQUIV.

This light weight or low bulk density and minute pore size assure low heat storage and high insulating value. The results are substantial savings in furnace weight, construction and fuel.

2 REHEAT SHRINKAGE—0.0% AT 2250°F.

This stability insures longer furnace life, reduces maintenance requirements and lowers overall costs.

3 LOWER THERMAL CONDUCTIVITY—K value at 2000°F.—1.47

The furnace sections above show how HW 23LI—used to back up firebrick furnace walls—have reduced heat losses 59.3%. The savings are substantial in fuel, space, time and weight.

4 ALL THIS—AT NO SACRIFICE OF OTHER IMPORTANT PROPERTIES

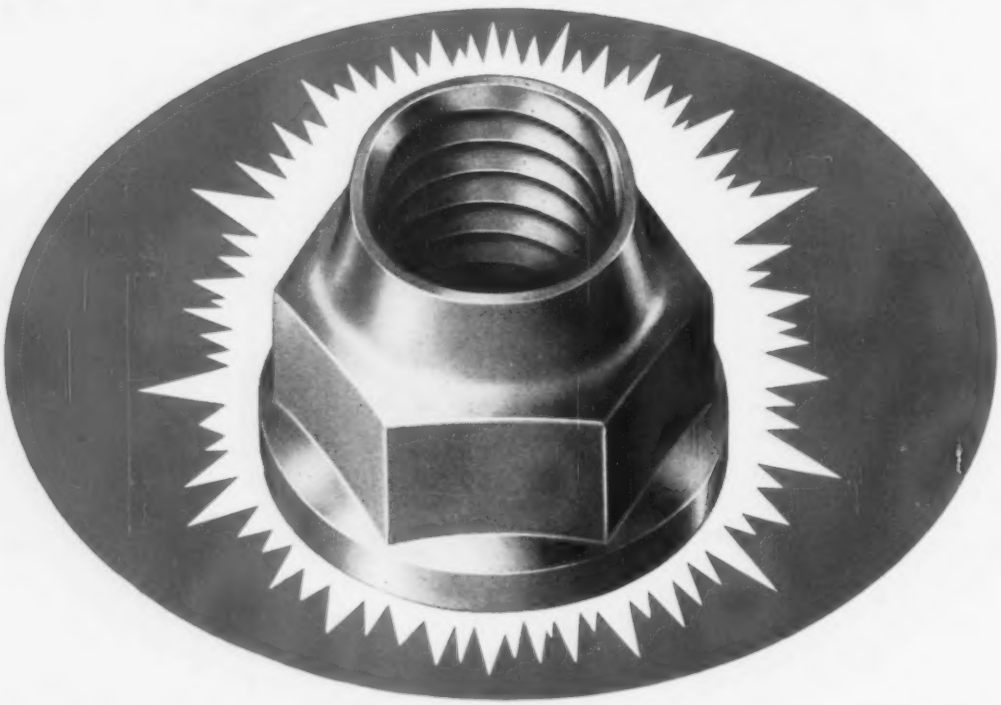
The beneficial properties of HW 23LI have been developed without sacrifice of crushing and transverse strength or other desirable physical or chemical characteristics.

HW 23 *Low Iron* Insulating Firebrick were developed especially for controlled atmosphere furnaces. The *low iron* oxide content provides much greater resistance to furnace gas atmospheres than ordinary insulating firebrick. They are also used wherever 2300°F. insulating firebrick are required. Write for complete product and application details.

HW 61-19

ALLEN introduces

LOKON....



True to its name, the LOKON nut locks on a companion threaded member with a can't-shake-loose grip . . . holds indefinitely against heaviest impact and vibration. Because the basic design allows adequate deformation of the "turret top" without overstressing any portion of the periphery, "LOKONS" are highly resistant to fatigue failure. And, through closely controlled heat treatment, a degree of elasticity is achieved which permits re-use time after time without significant impairment of the locking action.

LOKON locknuts assemble fast and easy . . . start with finger spinning . . . tighten smoothly . . . lock at any point as soon as the threads in the elliptical section are fully engaged, and are readily removed without damage to the nut or mating part.

Investigate LOKON at the first opportunity. Discover the many ways this major development in locknuts can save you time and cut costs. Test samples* and engineering data are yours for the asking. And, for prompt, off-the-shelf delivery, call your nearby Allen Distributor who carries full stocks of LOKON locknuts as well as dependable Allen hex-socket screw products.

**Currently offered in sizes from No. 10 through ½", UNC and UNF threads. Other sizes available soon.*

ALLEN HEAD **ALLEN**

THE ALLEN MANUFACTURING COMPANY
HARTFORD 1, CONNECTICUT, U. S. A.
Plant at Bloomfield, Conn. • Warehouses in Chicago, Cleveland, Los Angeles

INDUSTRIAL DISTRIBUTION THE FIRST NAME IN MOTION

FOR OVER 50 YEARS, MAKERS OF

NEW . . . general-purpose LOCKNUT

holds positively tight even after repeated on-off cycles.

provides a "commercial" locknut in the "aircraft" quality range.

offers high strength without bulk for heavy-duty applications.

Only "LOKONS" offer all these extras . . . all without EXTRA COST!

ONE-PIECE, ALL-METAL CONSTRUCTION — The LOKON design requires no segments, inserts or other auxiliary locking devices.

HIGH-GRADE ALLOY STEEL — Heat treated to Rc 26/30. Imparts tensile strength in excess of 250,000 psi and provides lasting spring tension for unlimited re-usability.

CLASS 3B THREADS — Comply fully with specification MIL-S-7742 and H-28 Handbook.

BUILT-IN FLANGE — Large-area bearing surface saves washer cost, speeds assembly, reduces indentation. Face of flange is held square with threads to insure even distribution of stresses throughout the flange and thread area.

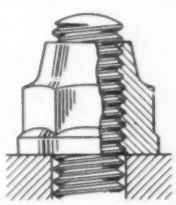
DIMENSIONAL ACCURACY — Allen "pressur-forming" processes control grain flow, hold tolerances to consistently close limits, and produce fully-formed hex corners for sure-grip wrenching.

HIGH TEMPERATURE SERVICE — Performance is unaffected at temperatures to 550°F.

MILITARY SPECIFICATIONS — LOKON locknuts fulfill the performance requirements of specification MIL-N-25027.

How *LOKON* locks . . .

The threads in the tapered crown of the nut are slightly distorted from the round. When assembled to a companion threaded member, this out-of-round condition causes the nut to resist free entry of the mating part. As the metal flexes in an effort to conform to the circular pattern of the male threads, friction on the flanks of the nut threads is increased. The compressive forces exerted as a result of this diaphragmatic flexing action produce a positive, powerful locking grip.



FAMOUS ALLEN SOCKET SCREW PRODUCTS

PRECISION is the watchword during every step in the manufacture of Blaw-Knox Rolls. This extra care at every step, maintained by constant close inspection, is your assurance of rolls having the exact properties, dimensions, and finish for maximum service in the stand.

Our rollmakers have more than a century of close association with the metal rolling industry in the development and manufacture of rolls to meet the most rigid service requirements.

Blaw-Knox Roll Engineers welcome the opportunity to join with you in selecting rolls of the proper grade and design for your operations.

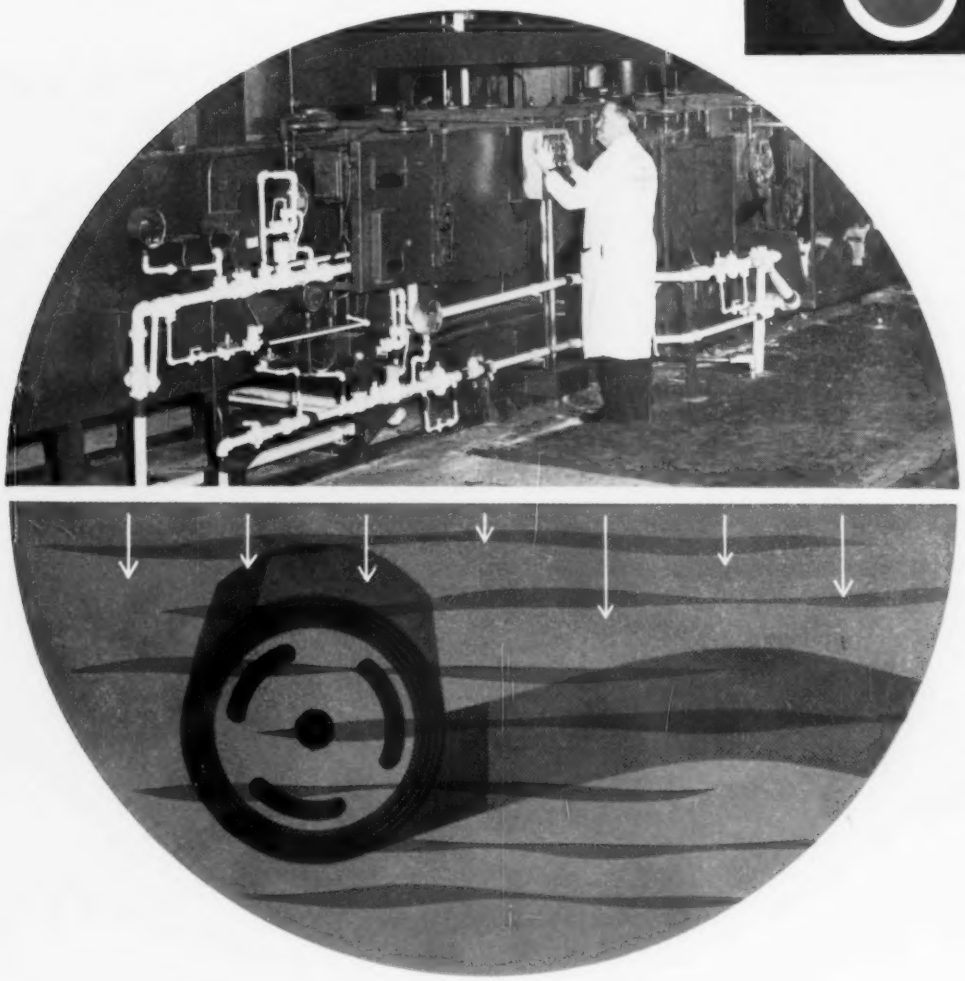
Blaw-Knox Company, Foundry and Mill Machinery Division, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.

BLAW-KNOX

ROLLS

Pennsalt System Approach for better cleaning

EQUIPMENT CHEMICALS



Stainless strip cleaned to "white glove" perfection

A major reason why stainless steel strip made by Superior Steel Division of Copperweld Steel looks uniformly stain-free *after* annealing is the thorough job of cleaning *before* annealing . . . by a team of Pennsalt chemicals and equipment.

The equipment. An automatic, multi-stage Pennsalt washer provides a cycle of alkali brush wash, brush rinse, steam flood and drying—"white glove" cleaning that completely removes mill soils which might burn on in the furnace with resultant discoloration. Strip up to 24 inches wide, in gauges from .010 to .050, is handled at speeds up to 90 feet per minute.

The chemicals. One of the standard Pennsalt cleaners, a concentrated, granular alkaline material designed specifically for spray or soak cleaning of steel or brass, was recommended by Pennsalt field men for the specific soils encountered at Superior Steel.

Pennsalt System Approach. Because we make both chemicals and equipment, we can team them for top quality and lowest costs . . . in cleaning, phosphating, drawing lubrication and pickling.

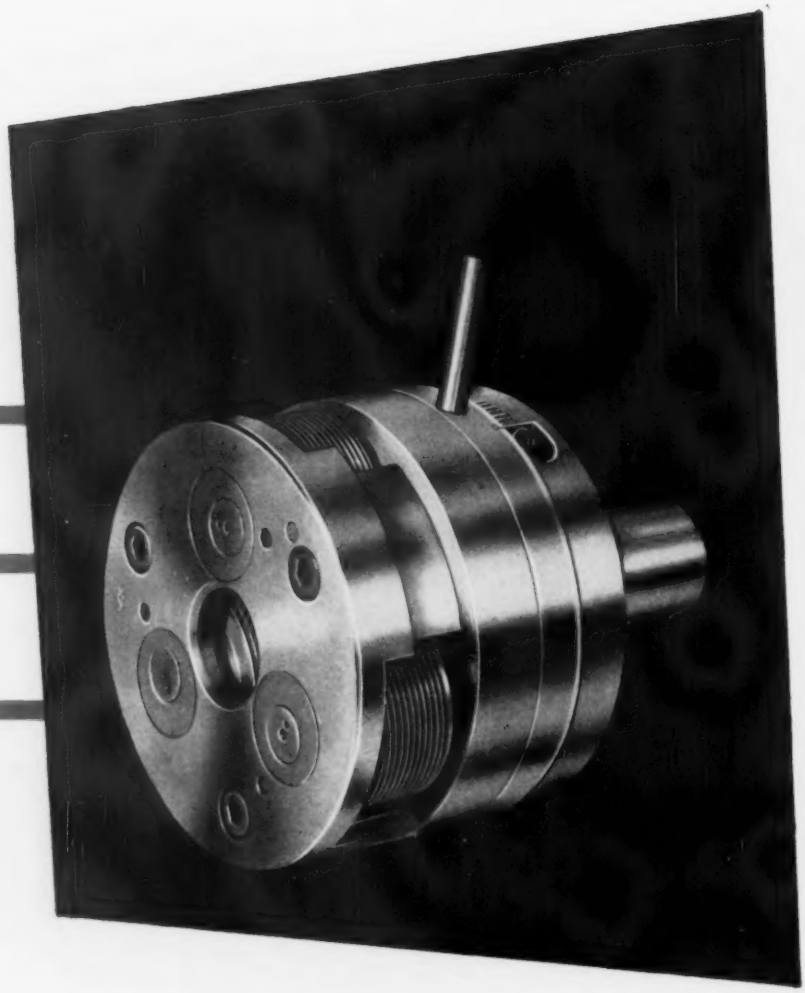
Nationwide service. Pennsalt specialists analyze your needs, aid start-up, then live with your line. Write or call today.

. . . a better start for your finish®

Metal Processing Department
PENNSALT CHEMICALS CORPORATION
East: 3 Penn Center, Philadelphia 2, Pa.
West: 2700 S. Eastern Ave., Los Angeles 22, Calif.
Pennsalt Chemicals of Canada Ltd., Oakville, Ontario • Industrial Química Pennsalt, Mexico City

Pennsalt Chemicals
ESTABLISHED 1850

LANDIS THREAD ROLLING HEADS



LANDIS Research has developed the LANDIS Thread Rolling Head, **featuring replaceable helix angle bushings.** This unique basic design, through the use of relatively inexpensive bushings, allows rolling threads with exact helix angles without purchasing major head components. The same head may be used for producing both left- and right-hand threads through the use of right- or left-hand bushings sets.

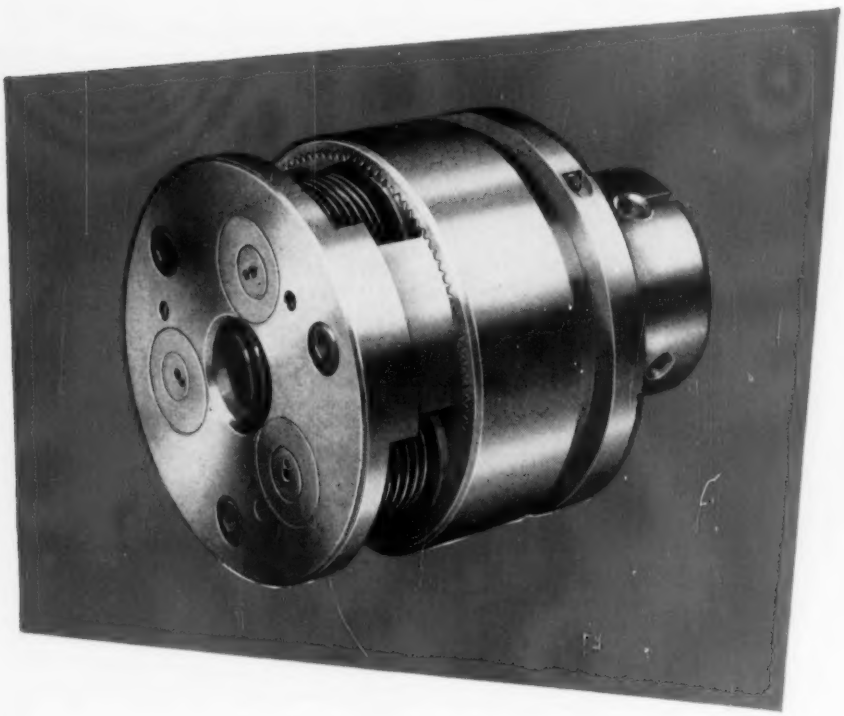
LANDIS Thread Rolling Heads will produce Class 4 threads of excellent finish at high speeds without impairing roll life. Rotary and Stationary styles are now available in five models with a range of ¼" - 2" UNF and UNC.

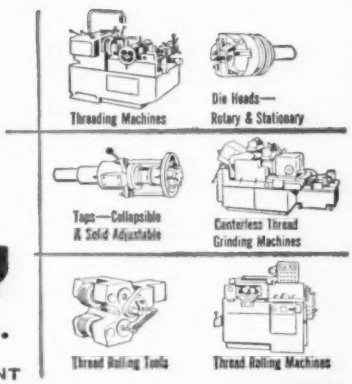
For complete information on the new LANDIS Thread Rolling Heads, please write and request Bulletin F-99.

LANDIS Thread Rolling Heads can be operated at speeds used for carbide tooling, and produce strong accurate threads to Class 4 fit. Threads are of excellent microstructure and have a smooth burnished finish devoid of tool marks. After initial size has been established, these Heads can be operated indefinitely without adjustment as thread rolls never require regrinding. In addition, for maximum economy, the rolls are designed in a manner which allows them to be reversed and both ends used.

Both Stationary and Revolving styles of LANDIS Thread Rolling Heads are self-opening in operation. The Stationary Head is designed for turret lathes, hand screw machines and bar automatics employing a stationary type head; while the Revolving Head is for application to bar automatics, threading, drilling, tapping and other machines utilizing a revolving type head.

One of the outstanding features of LANDIS Thread Rolling Heads is the use of replaceable helix angle bushings. One set of standard bushings function to roll both UNF and UNC threads. The helix angle established for this standard bushing set is a "mean" angle suitable for rolling all diameters and pitches within the respective UNF and UNC ranges of the Heads. However, when the exact helix angle is required, the proper helix angle bushings can be substituted for the standard bushings. This eliminates the need to secure costly major head components.





LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA • U. S. A.

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT

520C-3

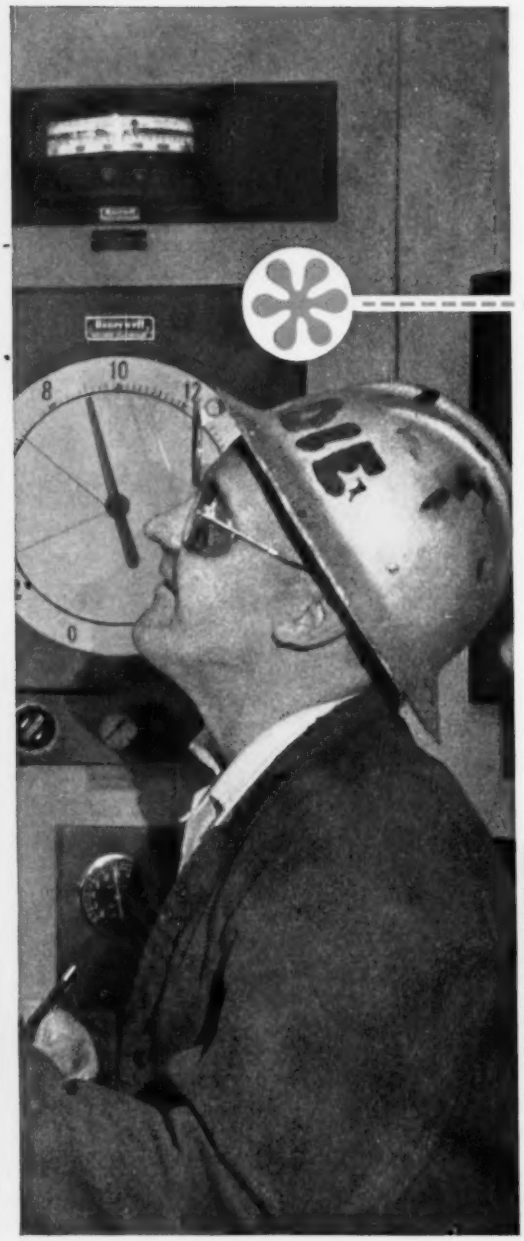
In a cubicle near the converter, an operator closely follows the progress of a blow. These Honeywell instruments indicate, record and control such variables as oxygen mass flow, lance cooling water temperature and pressure, lance position, and hood temperatures.

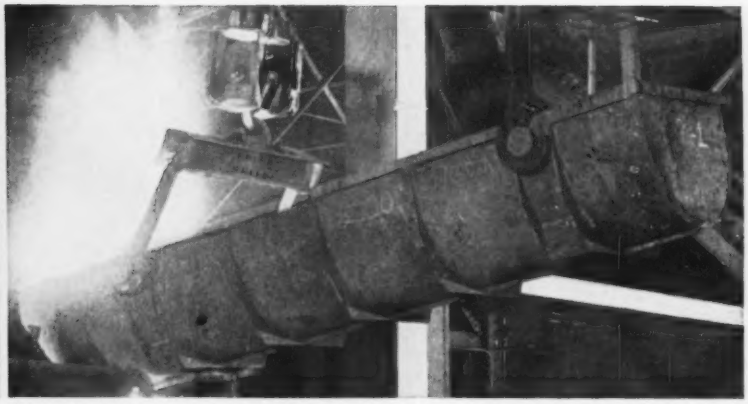
Honeywell-controlled BOF process

Acme Steel used to buy semi-finished steel slabs and billets to produce rolled strip, floor plate, strapping and other finished steel products. When limited supply threatened to block the company's potential growth, it turned to the basic oxygen furnace process as the economical method of producing its own steel.

Now, Acme's Chicago mill can produce a 75-ton heat of steel every 40 minutes with its new Honeywell-controlled oxygen process. Two continuous-flow hot blast cupolas are teamed with two oxygen converters to make many types of steel in small batches, at low cost per ingot ton.

The flexibility and economy of the mill's oxygen process stem largely from a carefully-engineered control system. Honeywell instrumentation accurately meters high-purity oxygen, maintains efficiency of the converter blow, protects equipment from excessive temperatures and guards safety of operating personnel.





Using a basic charge of about 80 percent molten iron and 20 percent scrap, Acme Steel's oxygen converters produce high-grade steel at low cost. About 2,000 cubic feet of high-purity oxygen is required for each ton of steel.

makes Acme Steel its own supplier

If you're planning to use oxygen—in a BOF or open hearth—you'll find it profitable to have Honeywell design your entire control system, tailored to the particular requirements of your mill. Your nearby Honeywell field engineer can give you full details. Call him today—he's as near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa. In Canada, Honeywell Controls, Ltd., Toronto 17, Ontario.

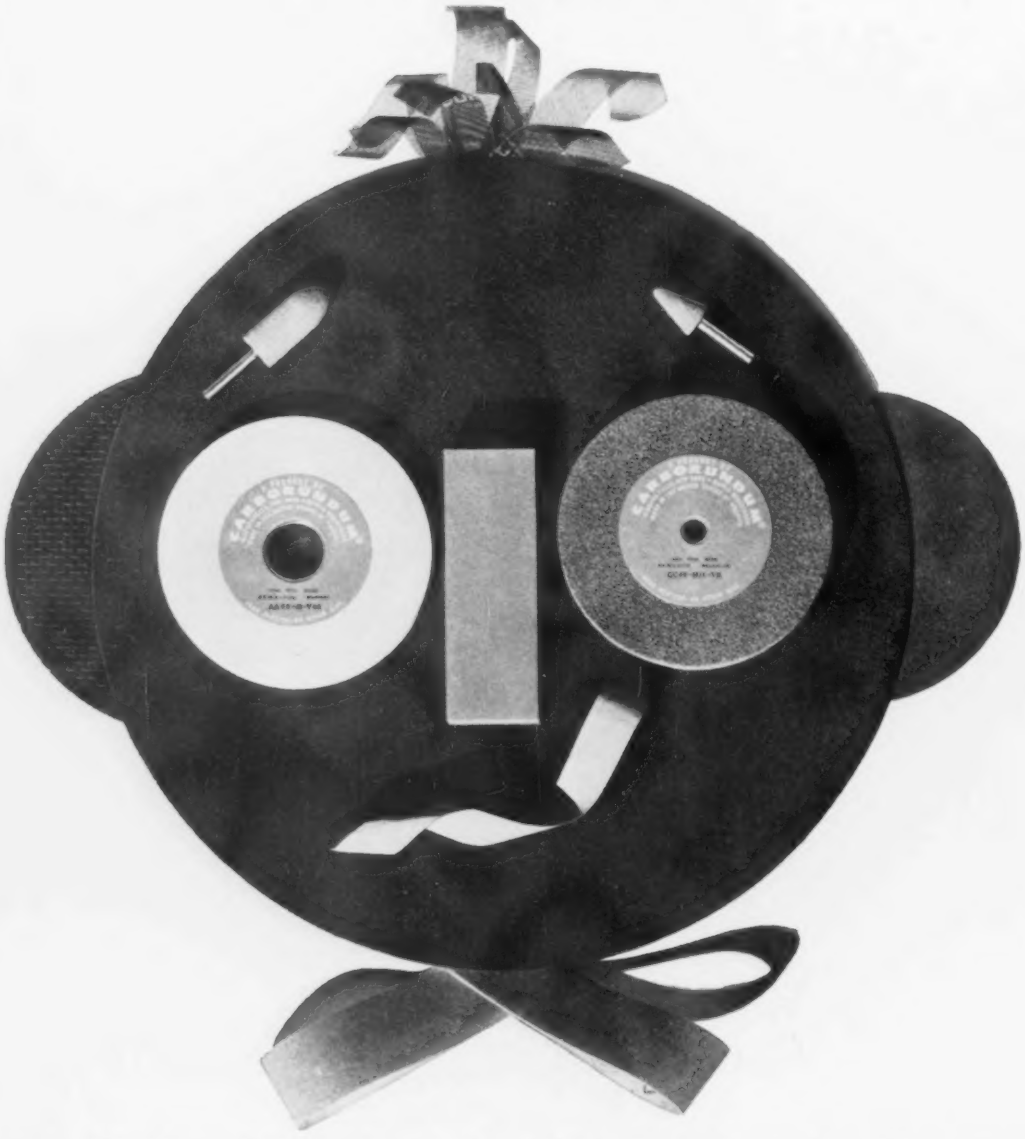
Honeywell

First in Control

SINCE 1885

HONEYWELL INTERNATIONAL Sales and Service offices in all principal cities of the world. Manufacturing in United States, United Kingdom, Canada, Netherlands, Germany, France, Japan.

ABRASIVE SELECTION HAVE YOU CONFUSED?



Turn to National Standards by Carborundum for the answer!

There is no reason to get tangled in complicated abrasive selection problems...Carborundum's Catalogs of National Standards make selection and pricing easy. Selecting National Standards can also save you money: you have lower inventory requirements for your plant...fewer purchasing and stocking problems...no large inventories of custom-formulated items. Complete local stocks are maintained based on your trading area requirements. You have minimum delivery problems...National Standard abrasives are shelf items awaiting your order. What's more, they are performance proved throughout industry—outperform most custom-formulated products time and time again. National Standards by Carborundum offer a full range of grinding wheels, diamond products, coated abrasives and industrial specialities. Your guides to Standards are: Catalog 1489, National Standard Grinding Wheels and Industrial Specialities—Catalog 1555, National Standard Abrasive Belts, Rolls, Sheets and Discs. If you don't already have your copy, phone your Carborundum distributor or factory representative now. Niagara Falls, New York. **CARBORUNDUM**

Plug these Profit Leaks

in on-again, off-again brite-wire fabricating with

DSC Long Production Run LPR® Coils

HERE'S WHAT USERS SAY after switching from conventional short-run coils (150 to 400 lbs.)

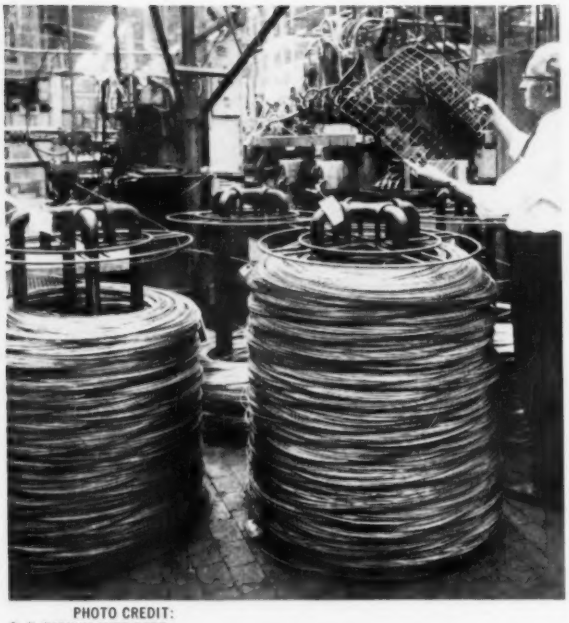


PHOTO CREDIT:
G. E. DISHWASHER DEPT.,
LOUISVILLE, KY.

DOWNTIME due to coil changing cut as much as 95%; productivity stepped up 20 to 33-1/3%; man-hour costs trimmed 20% and more. SCRAP slashed in direct ratio to coil changes eliminated per job-run (50 to 95%).

HANDLING EFFICIENCY boosted through fewer and faster material movements for equivalent tonnages; unloading time alone cut as much as 80%.

SPACE UTILIZATION improved from 25 to 75%. Example: 120—300 lb. coils, total weight 18 tons, required 180 square feet of floor space; the same weight in 12—3000 lb. LPR's took 45 square feet—only 25% as much. Free-standing LPR's can be compactly and safely pyramided for maximum get-at-ability; helps sharpen your inventory management, too.

IN ADDITION: With free-standing LPR's you can dispense with small racks and returnable carriers . . . You avoid the bother of caring for vendors' property and save freight costs, too.

Enjoy these EXTRA BENEFITS at NO EXTRA COST

Let us give you the fabricating facts on LPR's. If you wish we'll demonstrate what LPR's can do in your own shop, under your own operating conditions. Or, we'll arrange for you to talk your problems over with our own mill people and also let you see how we use LPR's in our Welded Wire Fabric plant—a man-size operation.

Call your nearest DSC Customer "Rep" or write: DETROIT STEEL CORPORATION, Box 7508, DETROIT 9, MICHIGAN

Customer Satisfaction—Our No. 1 Job

Customer "REP" Offices in Principal Cities

Steel The Bargain Wonder Metal

Performance Proved

DSC® **DETROIT STEEL**

HR and CR Sheet and Strip • Flat CR Spring Steel
Manufacturers' and HC Specialty Wire
Welded Wire Fabric

Detroit Steel Corporation—General Sales Office, Detroit 9, Michigan
Cable Address DETROSTEEL—New York

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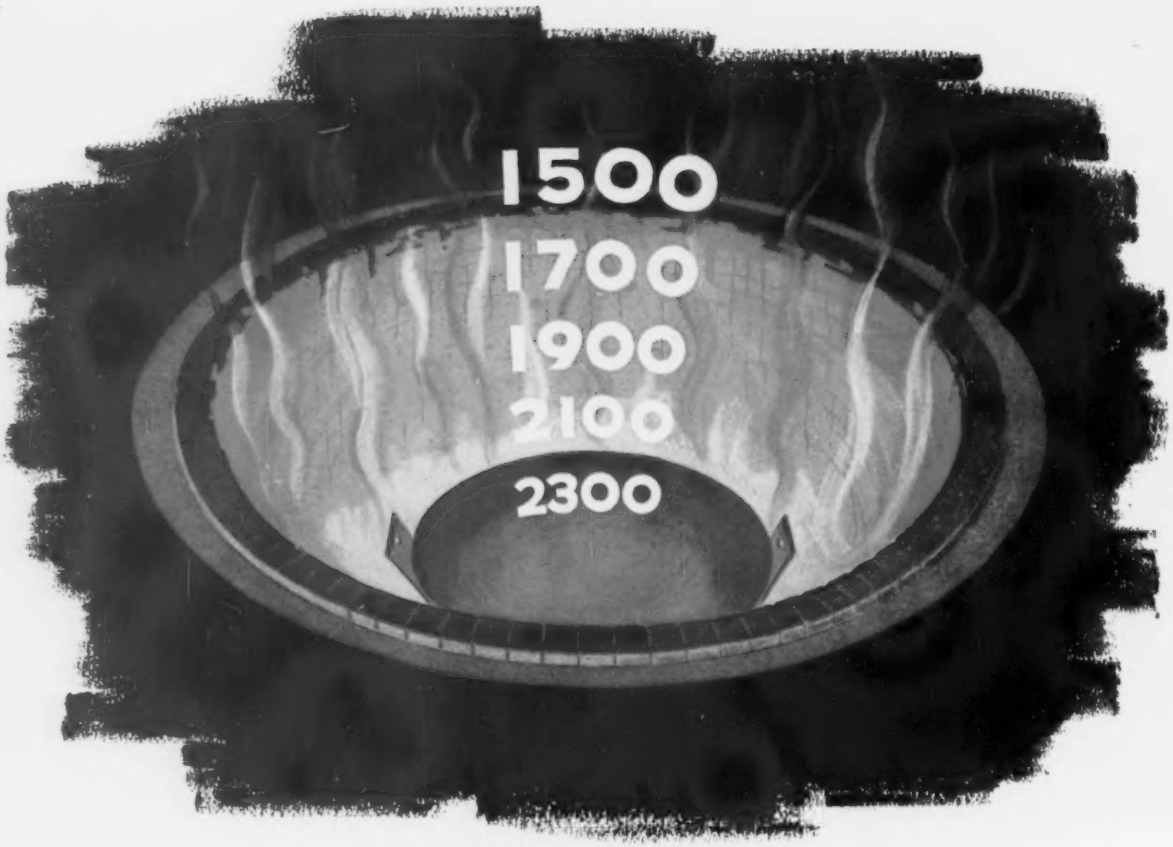


2300° HOT . . . *but not bothered!*

Retort made of HASTELLOY alloy X is removed from furnace after brazing cycle at 2300 deg. F.

RETORTS made of HASTELLOY alloy X and used for controlled-atmosphere brazing of rocket and missile parts at 2300 deg. F—last up to twice as long as retorts previously used. The alloy's high strength and resistance to oxidation and thermal shock make thinner walls possible. This in turn shortens heating cycles by 25 per cent . . . and cuts fuel costs by as much as 40 per cent.

Total savings during the 100-day lifetime of the retorts is about $1000—resulting from lower first cost, shorter heating cycles, 150 additional cycles per retort, and reduced costs for fuel and welding maintenance.

Resistance to stress, to thermal shock, to erosion, corrosion, and fatigue, are typical properties that make HAYNES alloys so extremely useful in jet engine turbine wheels, in ramjets, missiles, rockets, as well as industrial heat-treating applications.

Whether investment- or sand-cast, rolled, wrought, vacuum melted, or air melted, there's a HAYNES high-temperature alloy to meet your needs.

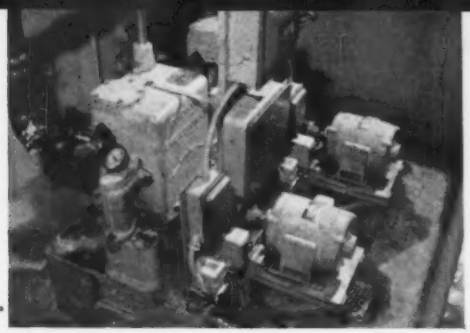
HAYNES
ALLOYS

HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
Kokomo, Indiana

Address inquiries to Haynes Stellite Company, 270 Park Avenue, New York 17, New York.

UNION CARBIDE

"Haynes," "Hastelloy," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.



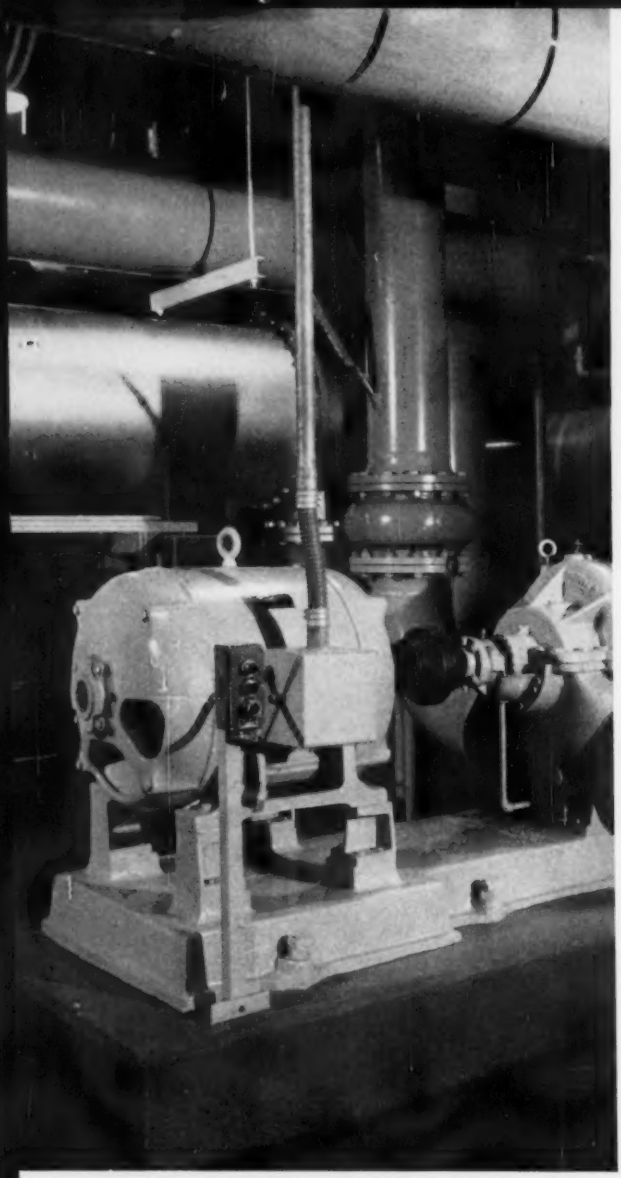
1.

CENTURY MOTORS ARE RIGHT FOR ANY PUMPING JOB

There is a service-proved Century motor for almost every industrial pump application—for centrifugal pumps, condensate pumps, chilled water pumps, reciprocating pumps and many more. Dependable Century motors have been performing outstanding pumping service for years in industrial plants, on farms, in power plants, in heating and air-conditioning units, and on hundreds of other demanding pumping applications.

Century motors have the precise speed regulation important in pumping. And they are exceptionally well protected against dirt, dust, and the severe moisture conditions frequently found in most pump applications.

Century standard squirrel cage motors are shown on this page on typical pump applications at Exchange Park, Dallas, Texas' completely air-conditioned "City within a City".



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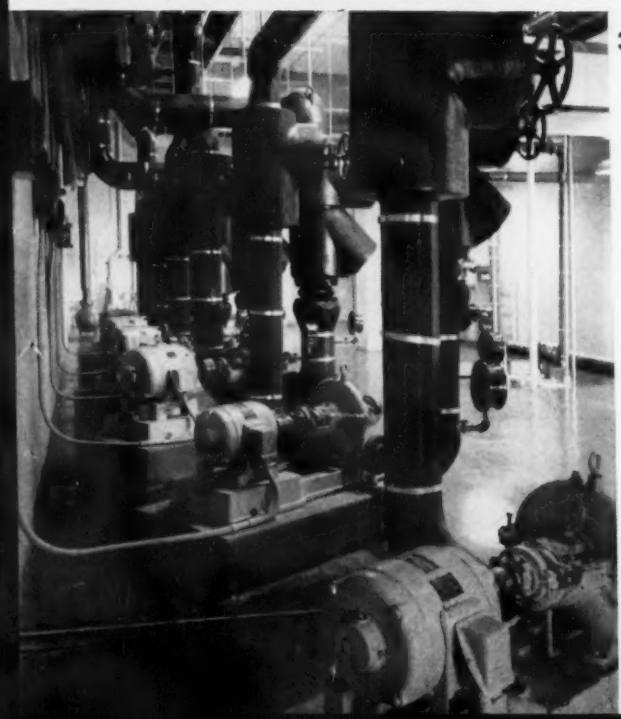


3.

1. **Duplex condensate pumps driven by two Century squirrel-cage 5-horsepower motors. Pumps are in a pit where dust and dirt make motor ruggedness important.**
2. **Century 75-horsepower squirrel-cage motor drives a condensate water pump.**
3. **Six chilled water pumps driven by a series of two Century 5-horsepower motors, two 15-horsepower motors and two 20-horsepower motors are in the power plant of this large commercial development site.**

Century motors on these three pump applications have been operating for years without service or maintenance problems—proof of Century motor dependability.

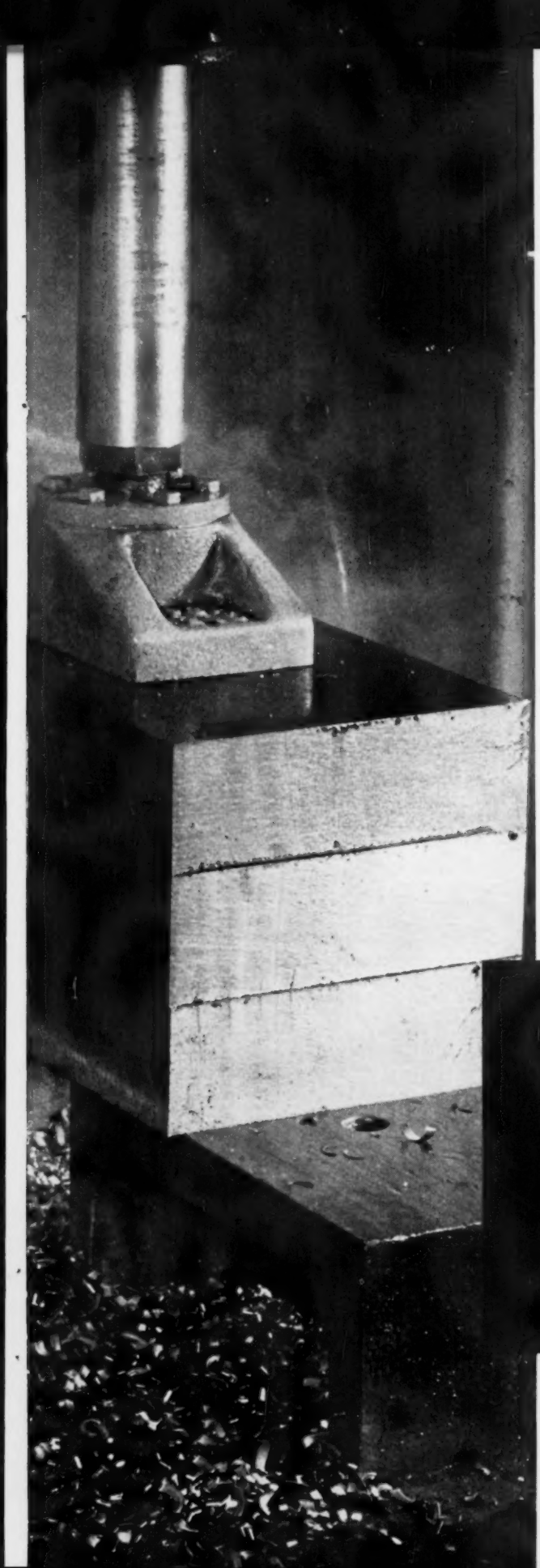
Century Electric application engineers have years of experience in applying the right motor to your job. Contact your nearest Century Electric sales office or authorized distributor for more information about dependable Century motors.

CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri *Offices and Stock Points in Principal Cities*

Century

60-11



ONLY J&L MAKES COLD FINISHED WIDE FLATS THAT ARE "MACHINE-SHOP PERFECT"

BECAUSE ONLY J&L COLD ROLLS FIRST, THEN DUPLEX MILLS THE EDGES.

J&L cold finished wide flats (six inches and up) are cold rolled and leveled—*then* the edges are duplex milled. Result? Wide flats with precise and uniform tolerances from bar to bar. Edges that are perfectly square and true.

Only J&L produces tool-and-die quality, "machine-shop perfect" wide flats. Operators depend on them for stripper and bed plates, dies, jigs, fixtures and machine cams that are accurate and uniform, require less machining.

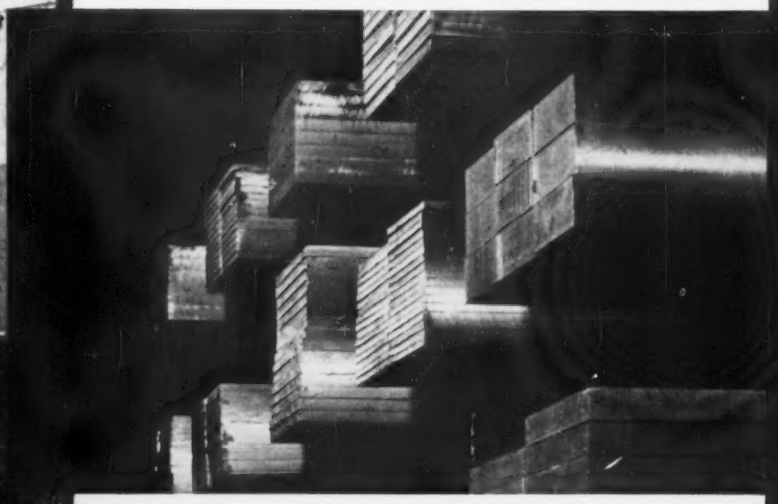
These prepared, machined flats are readily available from your local Steel Service Center in widths up to $14\frac{5}{8}$" and in thicknesses from $\frac{1}{8}$" to $2\frac{1}{2}$".

Jones & Laughlin Steel Corporation

3 GATEWAY CENTER, PITTSBURGH 30, PENNSYLVANIA

Where cold finished steel bars originated in 1859

Your Steel Service Center stocks J&L Wide Flats as standard items for quick delivery.



J&L Wide Flats are duplex milled after rolling to give you uniformly square edges that reduce or eliminate further machining.

Steel

Steel's Symbol of strength, long life, and economy.

Choose the files that have passed the toughest test of all

THE TEST OF TIME

In the 97 years we've been making files, our files have proved their superiority on every kind of job and on every kind of material.

As a result Nicholson and Black Diamond files have a brand preference second to none. This leadership comes from one fact: the best filing result for the least money. This test—the test of time—is the one significant test of file worth.

Each of the thousands of file types we make is the result of thorough and continuing research. The steel, the shape and size, the tooth pattern, the type of tooth—all have been determined by study in the laboratory of the world's largest manufacturer of files. Their correctness has been proved time and time again by users. Can you think of any more meaningful measure of a file's worth?

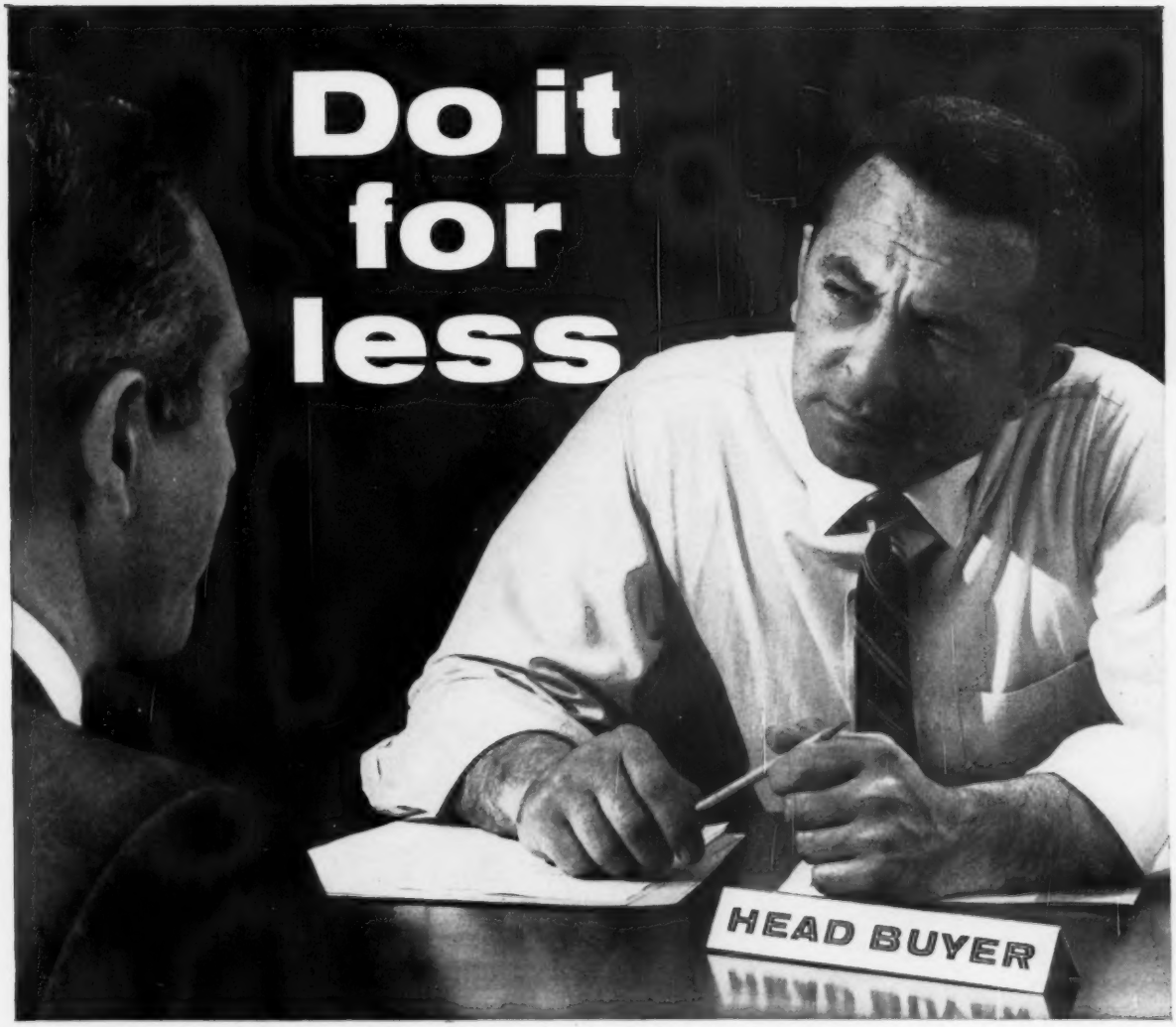
Your distributor* has the right Nicholson or Black Diamond file—and a wealth of information to help you get all the value we put in our files.

*Industrial Distributors provide the finest goods and services in the shortest possible time. Our products are sold exclusively through them.

NICHOLSON

Nicholson File Company, Providence 1, Rhode Island

Files • Rotary Burs • Hacksaw and Band Saw Blades
Hole Saws • Ground Flat Stock • Industrial Hammers



ON A CRI-DAN AUTOMATIC THREADING LATHE

Gisholt CRI-DAN Model B Automatic Threading Lathe

- Sets up in 8-15 minutes for maximum profits on job lots or long runs.
- Produces single- or multiple-start, standard or special form, left- or right-hand, straight or tapered, internal or external threads right up to shoulders, in a matter of seconds.
- Can combine threading with tracing and other machining during the automatic cycle.
- Provides top quality and fine finish in any material in a fraction of the time and/or cost required by milling, grinding, or special taps and dies.

Buyers can't afford to pass up a sales approach based on equipment that cuts threading costs 30-80%.

This advantage is attained with the Gisholt Cri-Dan Threading Method—that uses an inexpensive, single-point, carbide tool to cut *quality* threads in *any* material —*automatically!* Now, you can set up in 8-15 minutes and produce *any* type of thread in a matter of seconds. Accessories combine tracing and standard machining with threading for added savings. If you want to thread for less, *call your Gisholt Representative or write for Catalog 1215.*

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U. S. A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers® • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee

your HYATT *sales*

HE WORKS EFFECTIVELY TO HELP REDUCE YOUR COSTS!

No one knows more about cylindrical bearings than your Hyatt Sales Engineer! What's more, he's well versed in value analysis and can frequently produce dramatic cost reductions and important product improvement ideas. P.A.'s like his thoroughness . . . his sincere interest in making the best recommendation.

HE WORKS FROM EXPERIENCE IN PROBLEMS LIKE YOURS!

The experience and knowledge of this trained bearing specialist regularly help save vital man-hours and dollars for his customers. His painstaking study prior to every bearing recommendation has gained him an excellent reputation for efficient, dependable design suggestions.

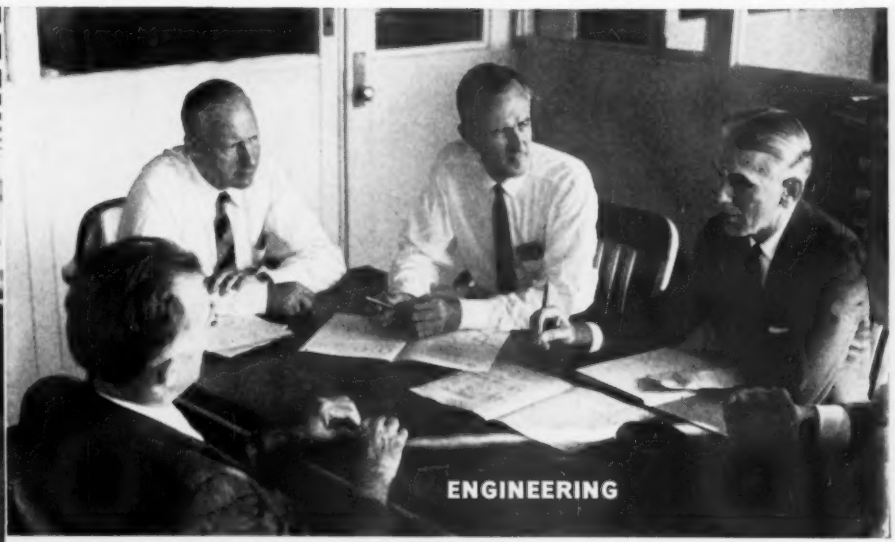
HE WORKS TO MEET RIGID QUALITY STANDARDS!

Frequently your Hyatt Sales Engineer will spend mutually rewarding hours studying customer products or prototypes in action. This helps assure the success of critical applications and often results in valuable suggestions for product improvement, cost reductions and ideas for future product development. At left, Hyatt Sales Engineer awaits surface finish test results on race pathway of farm tractor differential bearing.

HE WORKS TO MEET YOUR TIGHTEST SCHEDULES!

When delivery is a critical factor in your production schedule, sales department estimates or customer promises, you can rely on the *Working Partner* interest of your Hyatt Sales Engineer. Checking on your order from production line to shipping room, he works efficiently to make sure you've made a profitable purchase!

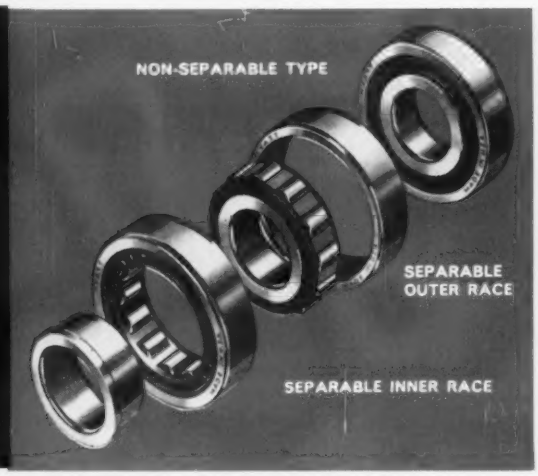
engineer is a working partner!



HE WORKS WITH OUR TOP ENGINEERING PEOPLE!

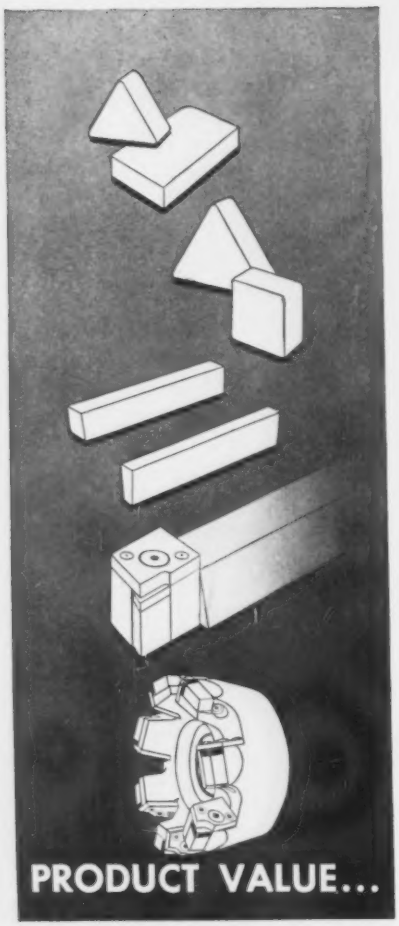
When you specify Hyatt bearings for your job, you get that *something extra* in engineering. The nation's finest bearing application engineers are assigned to your problem! What's more, you get the complete range of General Motors' vast research and engineering facilities. Above, your Hyatt Sales Engineer confers with metallurgist and thrust load experts before making final recommendation.

HE WORKS WITH THE MOST COMPLETE LINE IN THE INDUSTRY! Hyatt's new catalog (No. 162) places at your fingertips the most complete cylindrical bearing line in the industry...broad flexibility in handling all your anti-friction bearing requirements! Contact your nearest Hyatt Sales Engineer for your copy today.



HYATT *HY-ROLL BEARINGS*
FOR MODERN INDUSTRY

HYATT BEARINGS DIVISION, GENERAL MOTORS CORPORATION, HARRISON, N. J.



V-R FIRST CHOICE of more and more industries

VASCOLOY-RAMET cutting tool materials — cemented carbides, Tantung cast alloy and ceramic — meet the rigid standards of quality demanded by the uncompromising requirements of Value Analysis. Proven superior by every point of comparison, V-R products — blanks, inserts, tools, toolholders and face mill cutters — provide increased production with better size control and finish. Years of research, comprehensive testing and field service are behind every product manufactured at V-R.

VASCOLOY-RAMET provides added benefits . . . one-source responsibility for cemented carbide, cast alloy and ceramic cutting tools . . . plus reliable on-time delivery backed by strategically located reserve stocks. V-R expert counselling brings about increased efficiency, improved productivity and greater operating profits on your metal cutting operations. Contact your V-R representative for help on all these important points.

VASCOLOY-RAMET CORPORATION
808 Market Street, Waukegan, Illinois

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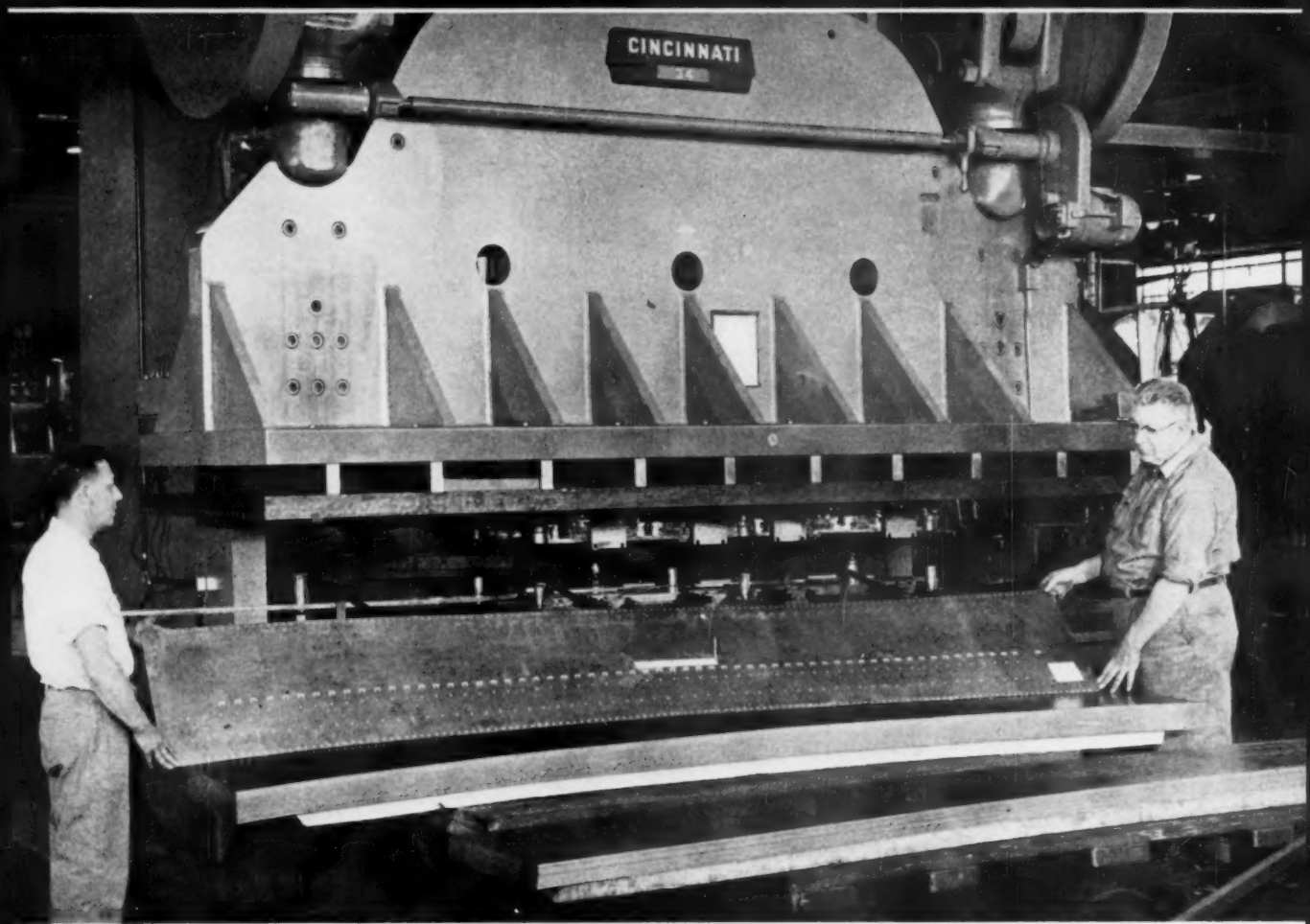
CINCINNATI® PRESS BRAKE
cuts press work costs



Courtesy Dahlstrom Manufacturing Corporation, Jamestown, N. Y.

For half the initial cost of a conventional press with equal die area and tonnage, the Dahlstrom Manufacturing Corporation does its press work on a Cincinnati Press Brake with widened bed and ram.

Its low first cost has been followed by other savings, too. For example, setup and operation are easy and fast because the die area is out in front of the housings. Floor-to-floor time per piece is half what it was with previous production methods. Cincinnati accuracy holds .005" tolerances between holes.

Dahlstrom uses the full versatility of the Cincinnati Press Brake for shallow draw work, blanking, notching, and punching. Ask our representative to show you how to earn similar savings in your shop.

Shapers / Shears / Press Brakes

THE **CINCINNATI SHAPER** CO.

Cincinnati 11, Ohio, U.S.A.

United Kingdom: The Cincinnati Shaper Co., Ltd., Glasgow, Scotland

Steel
Strong, Modern, Dependable

TO PUT MUSCLES INTO PARTS THAT MUST PERFORM

With the spotlight on reliability, *better make it forged* is an idea that merits serious consideration.

Forged parts offer the highest possible strength to weight ratios. They provide greater ductility, soundness, and fatigue resistance. And, forging assures superior part-to-part uniformity — in physical and mechanical properties, grain size, dimensions, and surface.

The truck transmission gear forging at left is an outstanding example of metalworking by the forging process to take advantage of the inherent directional properties of forged steel. Upset forged by Transue & Williams Steel Forging Corporation, Alliance, Ohio, the part has been cross sectioned and etched to reveal grain flow.

In forging, only quality controlled bar or ingot stock is used. Forging (or combination forging and extrusion) achieves grain refinement that produces the best possible material for response to heat treatment. In addition, die design is engineered to orient grain flow in the direction requiring maximum strength.

Republic Steel, the nation's largest producer of forging quality steels, offers a complete range of bar sizes, shapes, and materials. Teams composed of mill, field, and laboratory metallurgists can help you select and apply the most economical carbon, alloy, stainless steel, or titanium capable of meeting your requirements.

For information, contact your nearest Republic sales office or mail the coupon below. Please indicate if you would like a metallurgist to call.

REPUBLIC STEEL

REPUBLIC HAS THE FEEL FOR MODERN STEEL

REPUBLIC STEEL CORPORATION
DEPT. IA -2436
1441 REPUBLIC BUILDING · CLEVELAND 1, OHIO

Please send more information on forging quality:
☐ Carbon Steel ☐ Stainless Steel
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Have a metallurgist call:
☐ Carbon Steel ☐ Stainless Steel
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Name_____ Title_____

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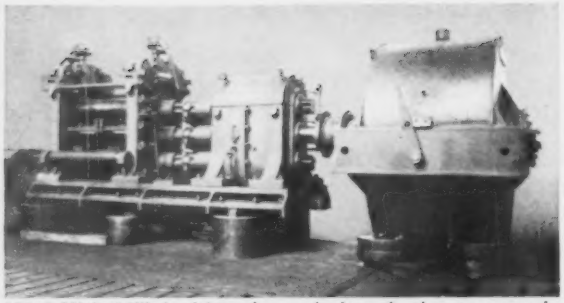
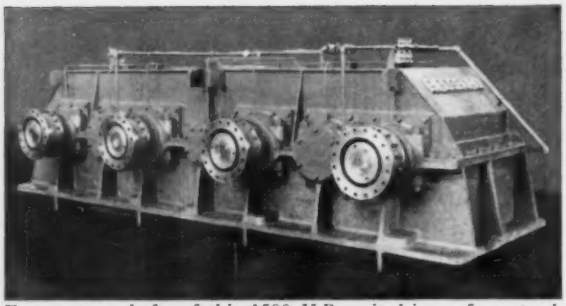
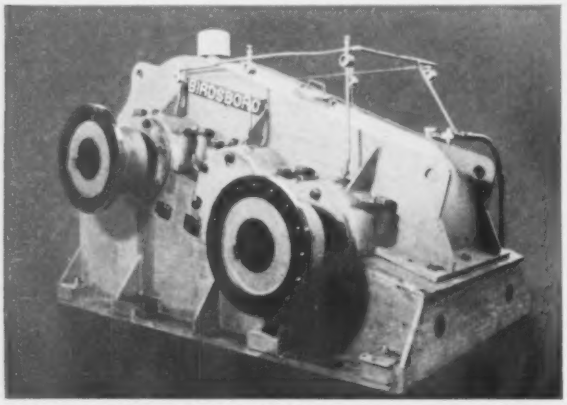


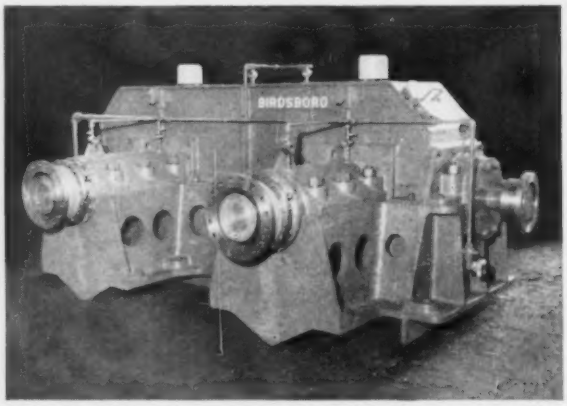
18" 3-High Mill is driven by a single reduction two speed, 1,000 H.P. Gear Drive. Speed changes are made by manually shifting a jaw type clutch on the output shaft.



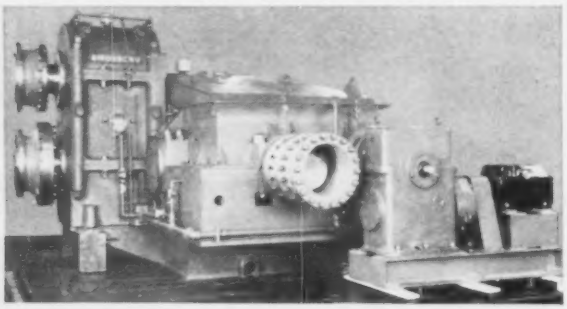
Four output shafts of this 1500 H.P. unit drive a four stand Continuous Mill with the proper speed increase for each stand.



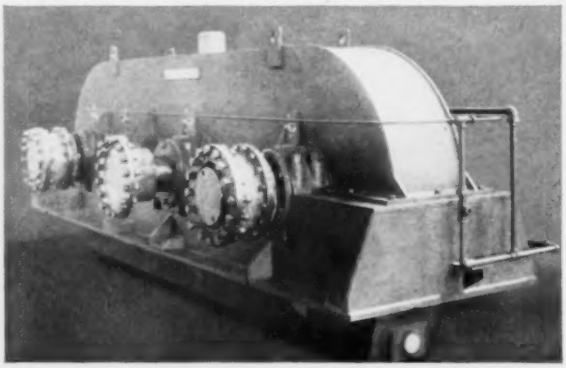
900 H.P. Single reduction double output Gear Drive is contained in a welded steel case. Output shafts on two levels, permit low floating shaft to pass beneath repeater to next stand of Cross Country Mill, driving mill in opposite direction.



Two 400 H.P. motors can transmit their entire power to either drive, for rolling heavy sections, or by disconnecting the bevel gear units each motor can drive a stand independently for looping.



A 3000 H.P. Drive has two output shafts for driving two 20" Mills, one directly and one through a low shaft and four-high Pinion Stand. First reduction is spiral bevel to conserve space in mill building. Second reduction has two ratios with a gear tooth clutch to give alternate output speeds of 76 RPM, or 155 RPM. Inching drive is provided to back out cobbles, and to facilitate coupling up. This drive is connected through air disc clutch for rapid remote controlled engagement.



A single 1250 H.P. motor drives a three stand 14" Cross Country Mill through a single reduction herringbone gear train. All gearing is carried on anti-friction bearings and lubricated by circulating oil for long, wear-free service.

SPECIAL MILL GEAR REDUCTION UNITS

designed and built by

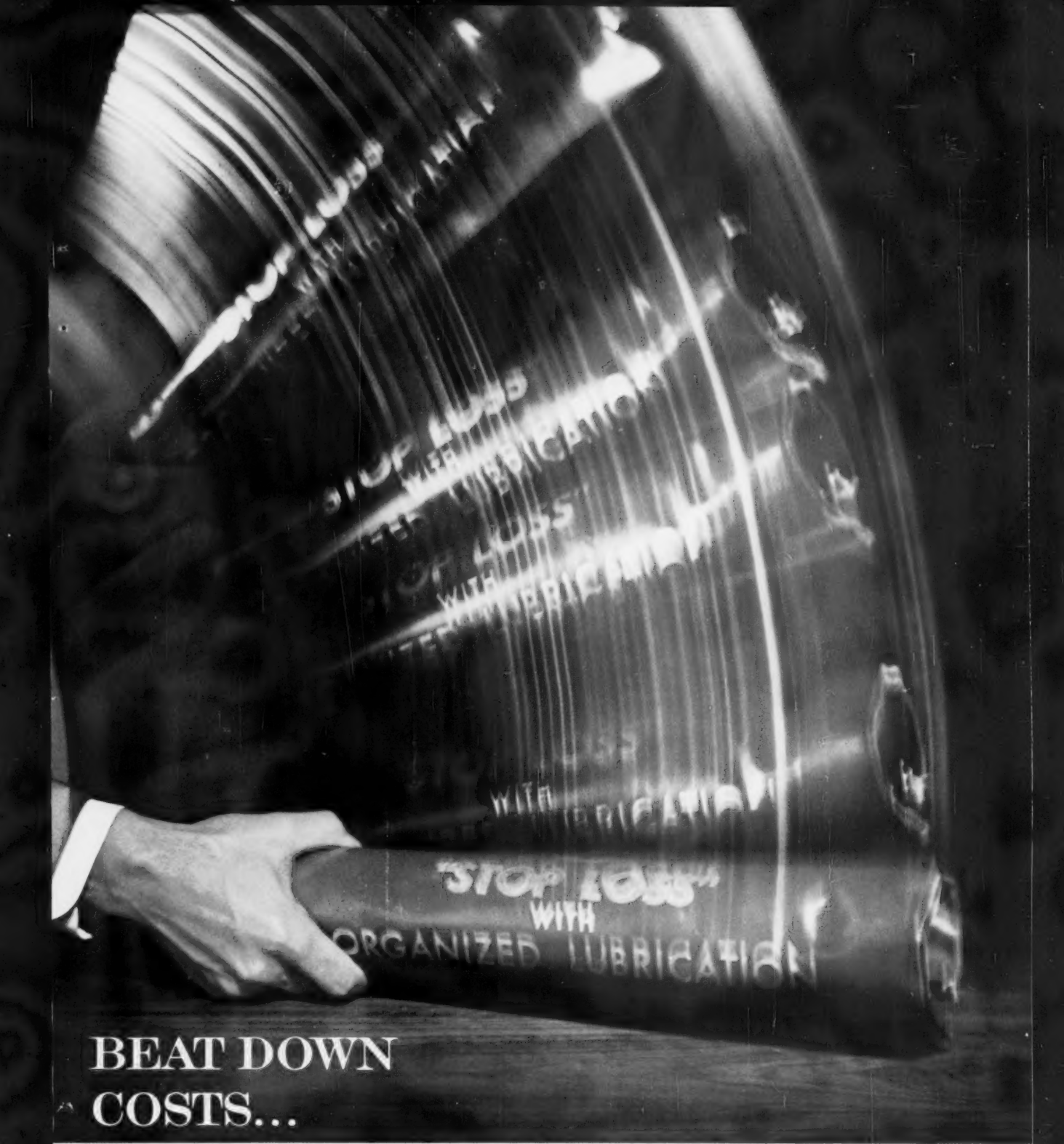
MM 5-61

BIRDSBORO CORPORATION

BIRDSBORO, PENNSYLVANIA

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • ROLLS • ELECTRIC STEEL CASTINGS: Carbon, Low Alloy and STAINLESS STEEL

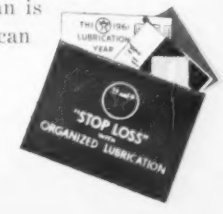
DIVISIONS: **MIRAWAL DIVISION • CHEMICAL MACHINERY DIVISION**



BEAT DOWN COSTS...

FOR UP TO 4% MORE NET PROFIT

The Texaco man has a weapon widely used by management caught in a profit squeeze. It's Texaco's "Stop Loss" Program—a new concept of cost control through organized lubrication. Right now, this plan is helping manufacturers everywhere to save. Find out how it can help you cut your maintenance costs by as much as 15%—add as much as 4% to net profits. Write for our informative folder: "How to Starve a Scrap Pile." **TEXACO** INC., 135 East 42nd Street, New York 17, N. Y. Dept. IA-210

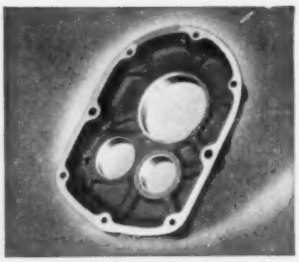


...the quality-engineered package

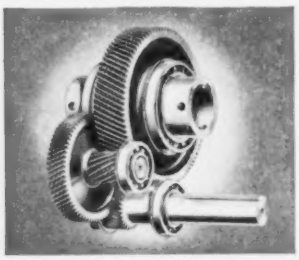
that simplifies speed reduction

DODGE TORQUE-ARM, America's most widely used shaft mounted speed reducer, will save money for *you.* No foundation, no sliding motor base, no flexible coupling, no installation fuss. Developed and perfected by Dodge, this reducer has been so widely accepted in industry that it is now built and stocked in this unmatched range of sizes and models: capacities up to 170 hp; output speeds from 10 to 400 rpm; ratios of 5:1, 15:1, 25:1; speed ratios up to 175 to 1 with correct selection of speed reducer and V-belt drive. Built-in backstop available. Also positive overload release. Vertical models. Flange mounted models. Special application models... Go modern—go Torque-Arm! See your Dodge Distributor, or write us.

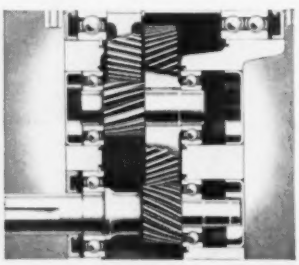
Dodge Manufacturing Corporation, 800 Union St., Mishawaka, Ind.



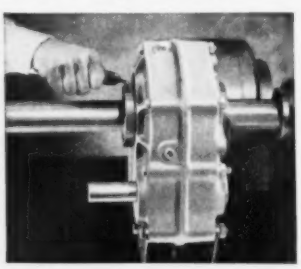
Rugged, semisteel housing holds bearing seats in line for entire life of unit. Laughs at loads. Corrosion resistant.



AGMA rated helical gears. Soft cores withstand shock; hardened surfaces defy wear. Teeth are crown shaved.



Gears are located *between* bearings and carry their loads without strain. Longer life, higher efficiency.



Unit slides completely onto shaft and locks on *both* sides of housing. This baby stays *put*—runs truer longer.

The Products with the Pluses... **DODGE** ***of Mishawaka, Ind.***

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Look under "Dodge Transmissioneer" in the *white* pages of your phone book. Factory trained by Dodge, he can give you valuable assistance.

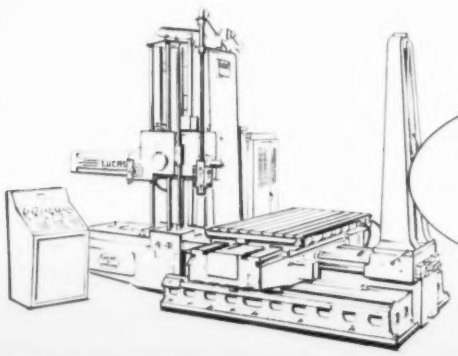
Versatility of Performance?

LUCAS

Lucas offers the widest range of machining operations possible on boring, drilling and milling equipment. The same versatility of application applies to work ranging from precision missile components to big castings and forgings weighing tons . . . on models ranging from 2¾″ to 7″ spindle diameter.

Point-to-point positioning. Milling (face milling, picture frame milling, right angle milling), boring (line and stub), drilling, tapping, threading, plus *contouring and profiling of complex surfaces.* Repetitive accuracy to ±.0001.

If your replacement or expansion plans include the addition of either vertical or horizontal table type or floor type boring, drilling and milling equipment, get the details on what Lucas has to offer. Lucas Machine Division, The New Britain Machine Company, 12302 Kirby Avenue, Cleveland, Ohio.



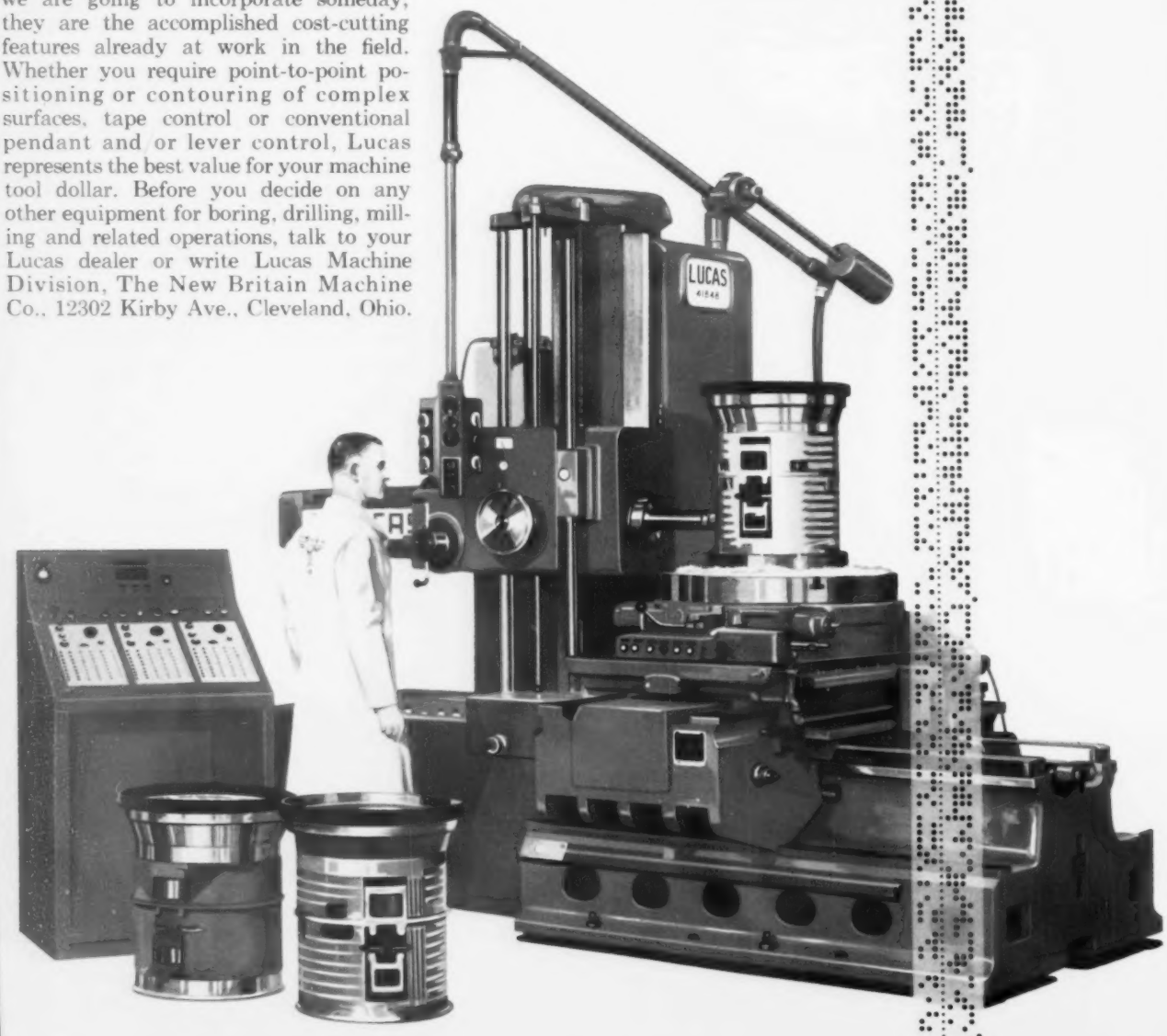
LUCAS
PRECISION

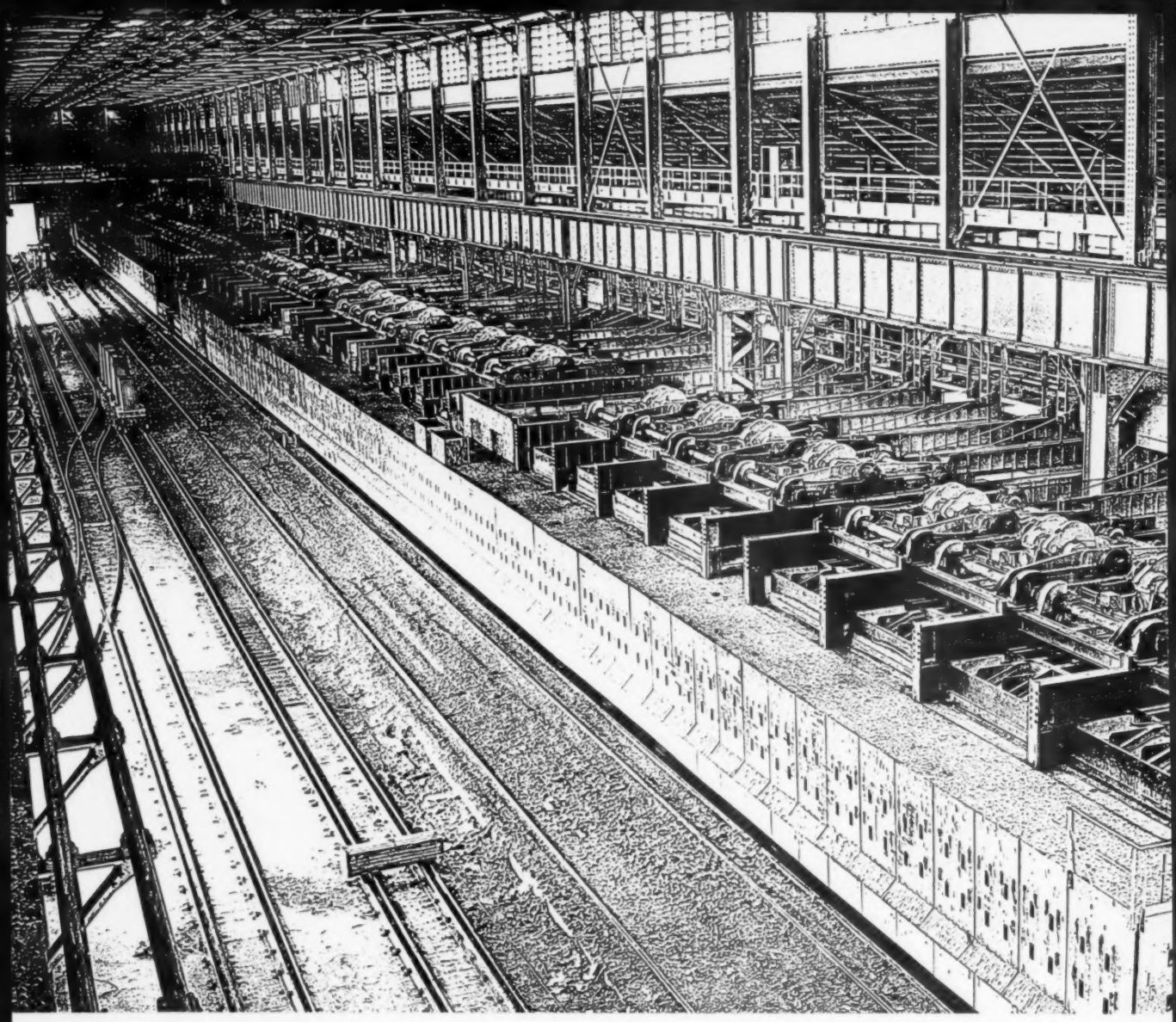
Saddle feed?

LUCAS

. . . plus precision flame-hardened column, table and saddle ways; a full range of speeds and feeds; maximum rigidity for precision machining accuracy on the heaviest cuts; air-lift to saddle and table during rapid traverse and every other major design and construction feature is available on Lucas boring, drilling and milling machines. These aren't the things we are going to incorporate someday, they are the accomplished cost-cutting features already at work in the field. Whether you require point-to-point positioning or contouring of complex surfaces, tape control or conventional pendant and or lever control, Lucas represents the best value for your machine tool dollar. Before you decide on any other equipment for boring, drilling, milling and related operations, talk to your Lucas dealer or write Lucas Machine Division, The New Britain Machine Co., 12302 Kirby Ave., Cleveland, Ohio.

LUCAS
PRECISION





Courtesy of Gary Works, U.S. Steel Corporation

Gets them out the back door (750 tons/hr) This is the largest installation of soaking pits (48) ever built at one time. Engineered by Surface, it will heat an average of 750 tons per hour. At peak capacity, it loads the ingot buggies at a rate of 1200 tons per hour. A dual recuperator system applies the maximum amount of heat where it belongs—inside the pit. Address inquiries to 2402 Dorr St., Toledo 1, Ohio.

SURFACE

SURFACE COMBUSTION, Toledo 1, Ohio/ a division of Midland-Ross Corporation MR

4-piece assembly replaced by one aluminum extrusion

Hundreds of manufacturers have taken a fresh look at their products. In doing so, they have discovered that extrusions like the one shown can now cut down on hand labor and replace costlier assemblies . . . or replace rolled, crimped, welded or machined parts.

Production techniques and aluminum alloys have improved rapidly. So it takes a specialist—an experienced independent extruder—to keep you up to date with all the cost-saving possibilities that extrusions now offer. To be sure you're taking advantage of possible cost savings, have a nearby extrusion specialist analyze your product line promptly.

It's good business to know one of these independent extruders . . . specialists who are supplied with top-quality aluminum ingot by Aluminium Limited.

...and then there was one:

MAIL THIS COUPON FOR EXTRUDER NAMES AND ADDRESSES.

Aluminium Limited Sales, Inc., Dept. IA 1109
111 W. 50th St., New York 20, N. Y.

Please send me a list of Independent Extruders in this area.

Name_____

Title_____

Company_____

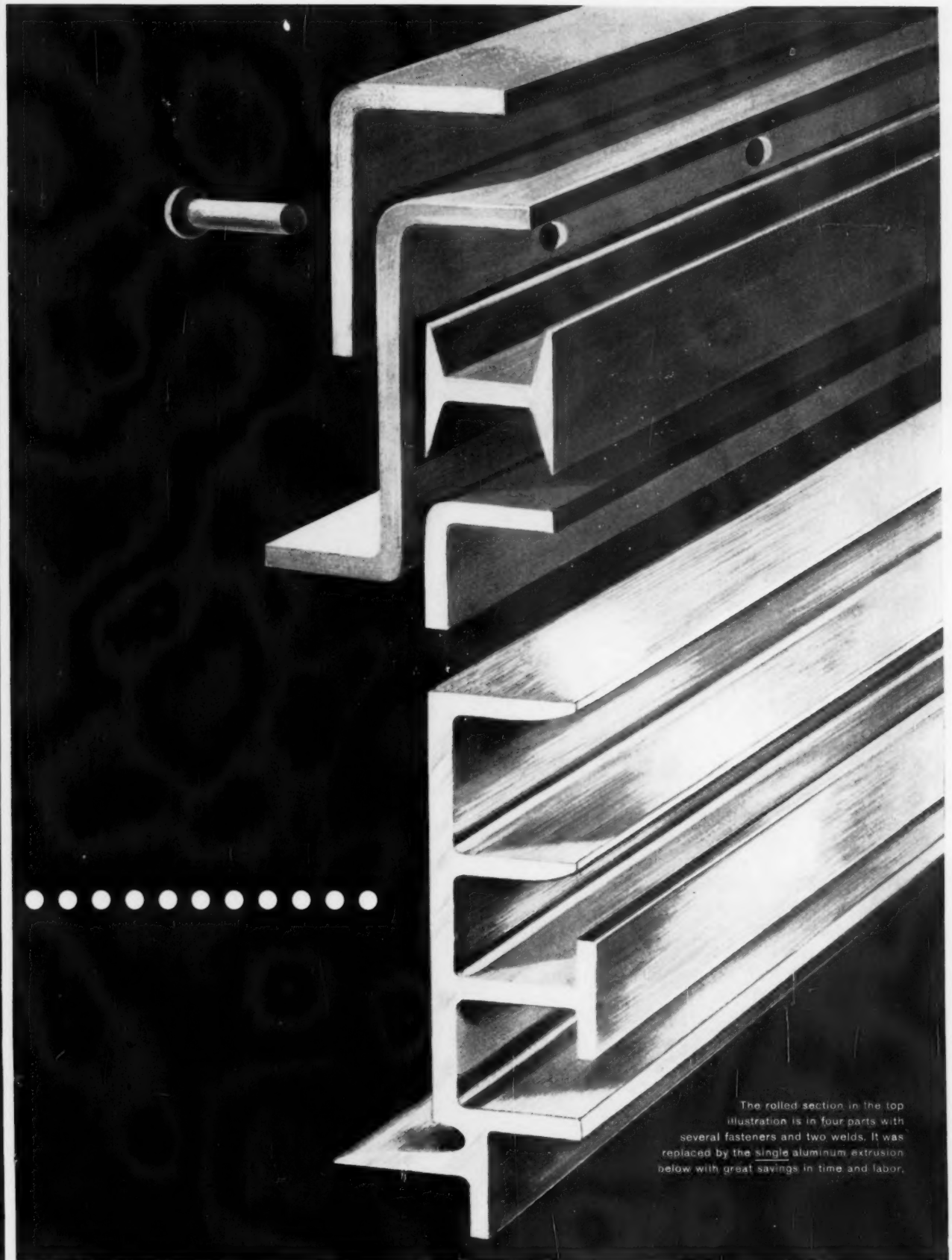
Address_____

City_____ State_____

ALCAN Supplying metal and ideas to companies that work with aluminum

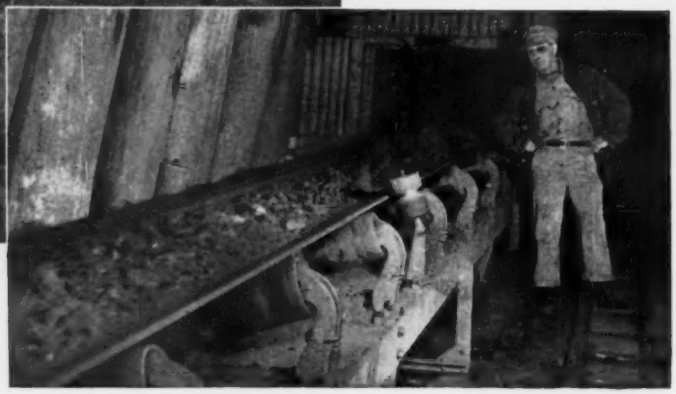
ALUMINIUM LIMITED

Aluminium Limited Sales Inc., 111 W. 50th St., New York 20, N. Y.



The rolled section in the top illustration is in four parts with several fasteners and two welds. It was replaced by the single aluminum extrusion below with great savings in time and labor.

40 STORIES *from Pit to Surface*



...IT'S R/M CONVEYOR BELT FOR LONG LIFTS!

Easy troughability, flexibility, super-strength synthetic cords, high wear-resistance—make R/M Conveyor Belts ideal wherever long lifts at high tensions are required. The installation shown here, for example, was a quarter-mile conveyor with a lift from pit to surface loading station nearly as high as a 40 story building. An R/M conveyor belt made an exceptional record on this rugged haul. There's an R/M heavy duty conveyor belt for every materials handling requirement . . . each engineered to haul fuller, heavier loads—and *last longer*. With proper engineering, for example, you can increase hauling capacity up to 60% with Ray-Man Conveyor Belt and 45° idlers! Ask your R/M representative about other R/M Conveyor and elevator belts, about advantages of extra-flexible, double compensated, rip-resistant Ray-Man . . . about Homocord, the extra-cushioned belt for unusually abusive shock loading conditions, or about the Wedlok metal fastener splice which avoids vulcanizing splices. Any R/M Conveyor Belt with "XDC" cover means extraordinary resistance to wear and tear, longer life—"More Use per Dollar." Write for Bulletin M302 and Catalog CB25.

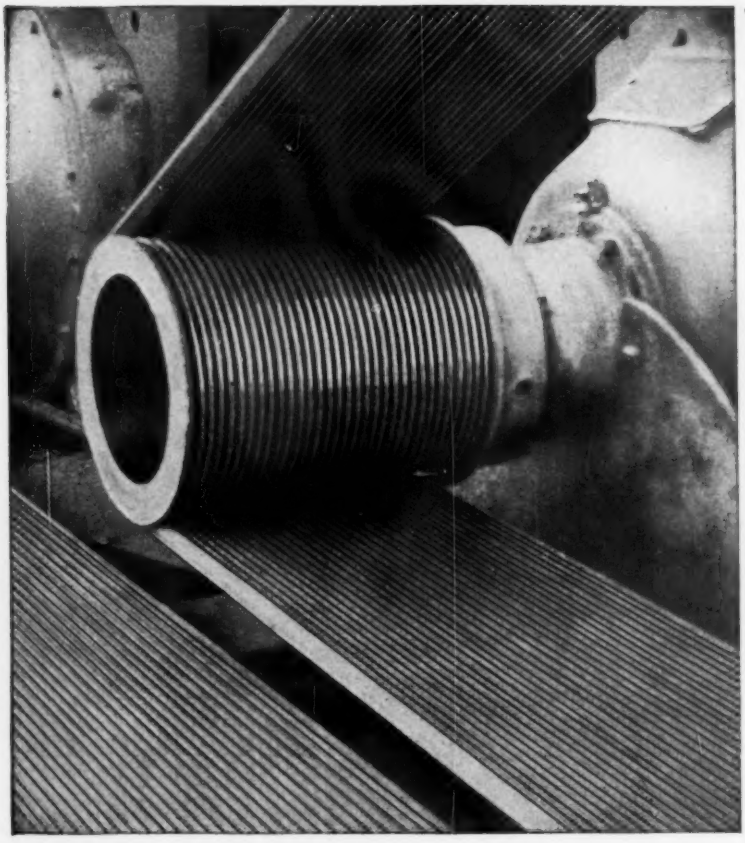
ENGINEERED RUBBER PRODUCTS ..."MORE USE PER DOLLAR"

RM

RM1018

RAYBESTOS-MANHATTAN, INC.

MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY



R/M POLY-V® DRIVE

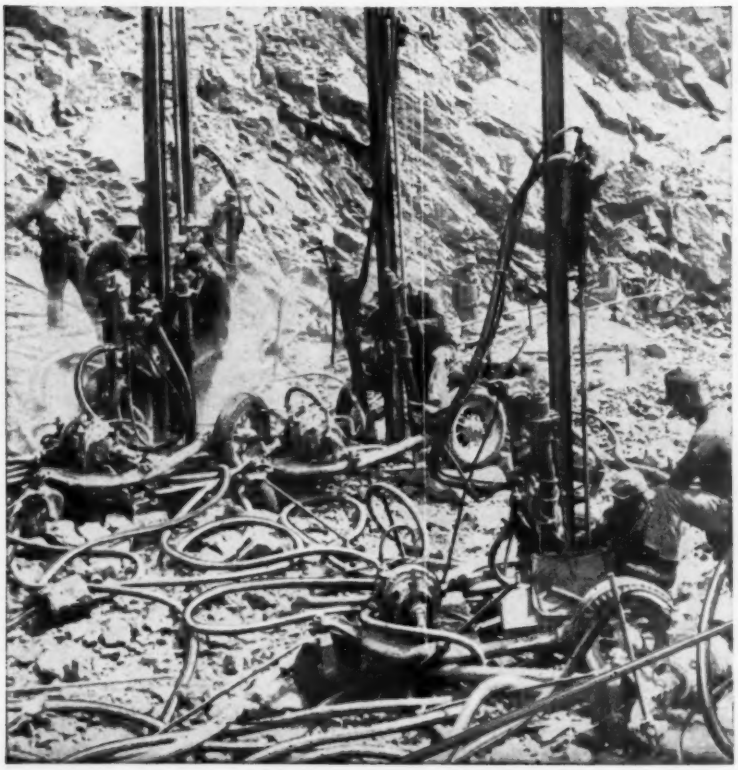
More Power—

in Less Space

. . . with Reliability

A *single unit* V-ribbed belt across full width of the drive-sheave—*not* an assembly of V-belts—enables patented Poly-V to deliver much *more* power in the same space as a V-drive . . . or *equal* power in much *less* space! Single unit belt design also eliminates belt "length matching" problems . . . minimizes equipment down-time and belt replacement costs. Belt speed ratios remain constant from *no* load to *full* load to provide the smoothest running, coolest running—*longest wearing* drive you can install. Maintain groove shape. Just two sections of Poly-V Belt meet every heavy duty power transmission requirement. Write for Bulletin M141, or call your R/M Distributor.

CONVERT TO RM POLY-V and BE SURE!

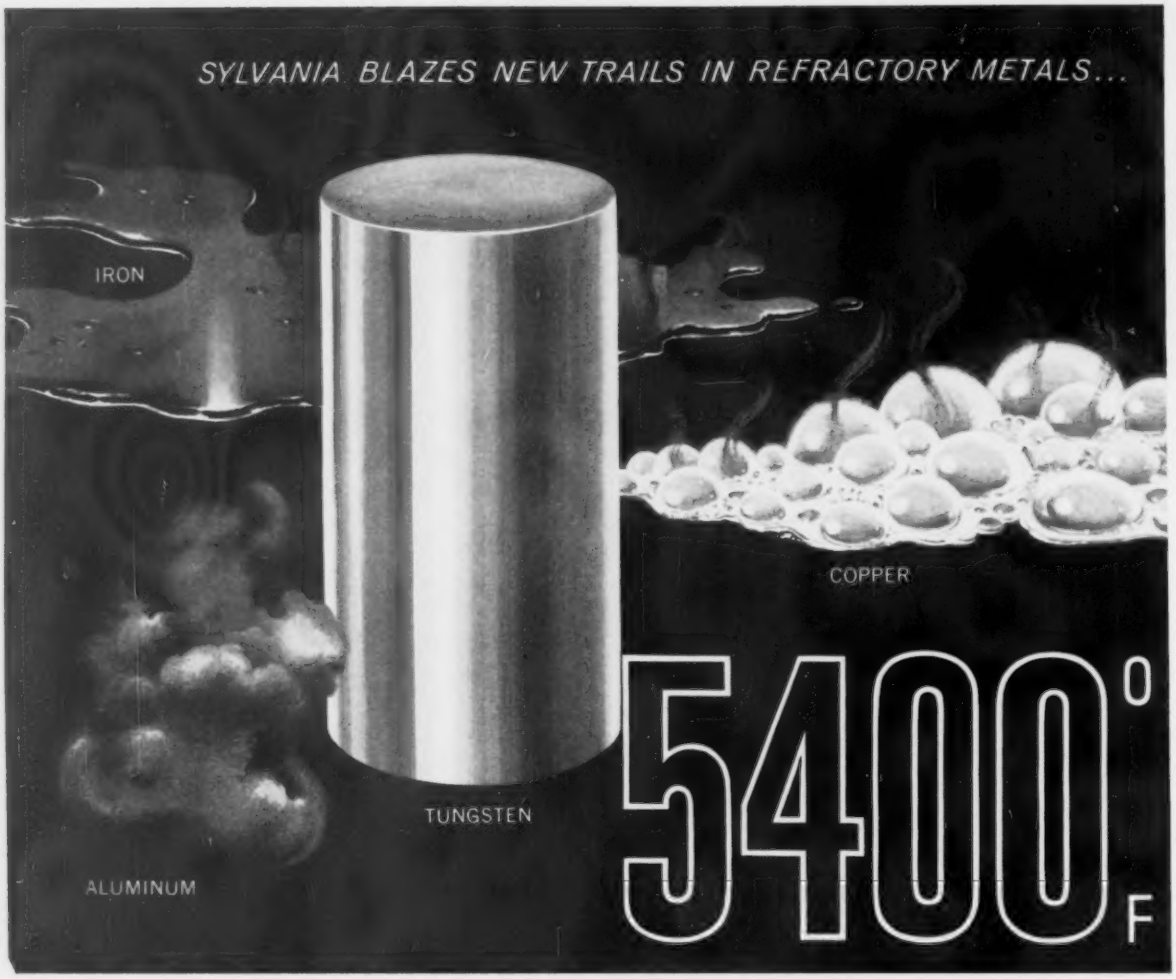


HOMOFLEX HOSE

more flexible, weighs less than any hose for equal pressure

- **SUPER-STRONG**
- **PRECISION BUILT**
- **NO PRE-SET TWIST—WILL NOT KINK**
- **INSEPARABLE TUBE-TO-COVER BOND**
- **UNIFORM INSIDE AND OUTSIDE DIAMETERS**
- **EASIER, SAFER COUPLING**

Strong, lightweight, and "flexible as a rope"—Homoflex is the easiest handling hose and lasts longer. Made in types for air, water, other fluids and gases. Ask about other types of R/M rubber hose for your job applications. Write for Bulletins M620 and M694.



DEFENSE-BORN SKILLS

. . . bring you high temperature metals shaped to solve your future needs!

At 5400° F. iron runs like water. Copper boils. Aluminum vaporizes. But tungsten keeps its strength.

To help you use this strength—and heat resistance—Sylvania now offers you the benefits of its unique versatility. It can produce tungsten and molybdenum for such different applications as billets and ingots for you to forge, as electrodes for your arc casting, as blanks for you to machine, or as blanks already machined to the most exact tolerances.

Sylvania can accomplish all this because it can now capitalize on developmental work done for the military—and bring you solutions to many long-standing riddles.

Have you given serious thought to refractory metals? The same properties that solve the problems of throat inserts for rockets and missiles can pay you dividends in gas turbines, jet engines, extruded airframe members, heat exchanger parts, piercing points and in many other ways.

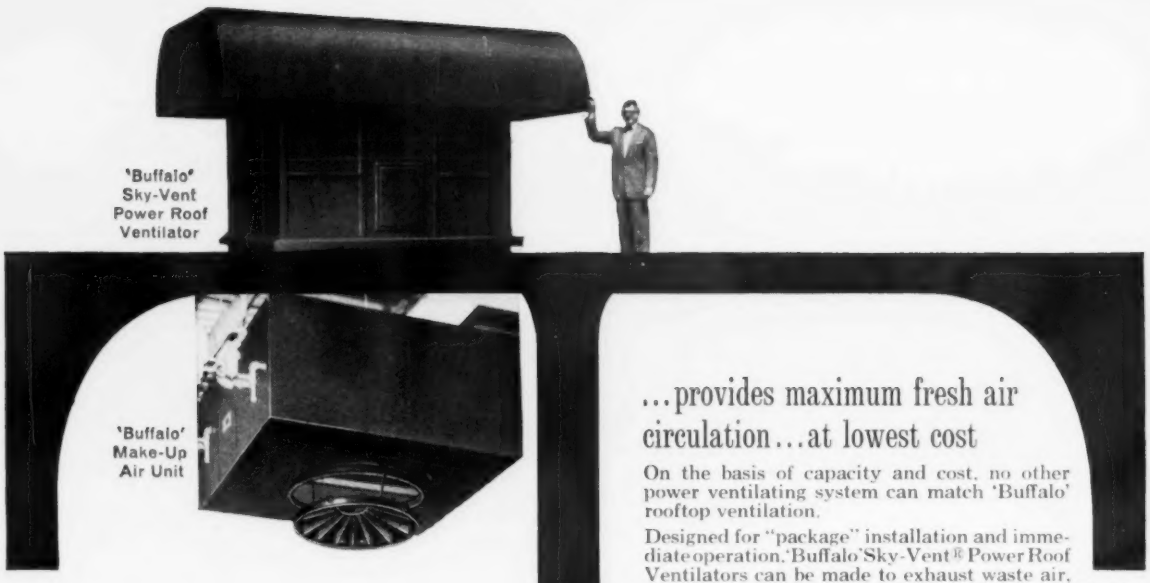
Want full details? Or experienced help in proving out your special ideas? Write Chemical & Metallurgical Division, Sylvania Electric Products Inc., Towanda, Pa.

SYLVANIA

SUBSIDIARY OF

GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM



'Buffalo' Sky-Vent Power Roof Ventilator

'Buffalo' Make-Up Air Unit

...provides maximum fresh air circulation...at lowest cost

On the basis of capacity and cost, no other power ventilating system can match 'Buffalo' rooftop ventilation.

Designed for "package" installation and immediate operation, 'Buffalo' Sky-Vent® Power Roof Ventilators can be made to exhaust waste air, or supply fresh air efficiently...in volume...*without ductwork of any kind.* Accessories such as filters, non-freeze heating coils, fresh and return air and face and bypass dampers can be supplied in stack of roof ventilator above roof level instead of in separate companion heater sections below roof level where desired.

Where extremely large amounts of air must be exchanged continuously, the tremendous air moving capacity of larger size 'Buffalo' units means that fewer units and roof openings are required...equipment and installation costs are held to an absolute minimum.

Available in 1000 through 250,000 cfm capacities with 12" through 120" wheels, 'Buffalo' Sky-Vents® ventilate entire plants...or sections of plants...with no interference to lighting, overhead handling systems or production line layout.

Rugged 'Buffalo' construction features tubular-braced hoods and stacks capable of withstanding the heaviest snow loads and hurricane force winds. All units are supplied with corrosion resistant coating.

'Buffalo' MAKE UP AIR HEATER SECTION used under Style "H" Sky-Vent®. This high capacity heating and/or filtering unit for use with 'Buffalo' rooftop power ventilators...requires no ductwork. Available in any combination of fresh and return air dampers, face and bypass dampers, filters, non-freeze heating coils, or reverse design wheels for summer exhaust.

'Buffalo' ROOF-TOP Ventilation

Your nearby resident 'Buffalo' representative has the complete story on these versatile ventilating packages. Give him a call, or write home office for Bulletin 2345.

"Buffalo"

AIR HANDLING DIVISION

BUFFALO FORGE COMPANY

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

Standard Forge & Axle Co. forges 5-inch by ½-inch Pittsburgh Seamless Mechanical Tube ends down to 2⅝" solid steel wheel spindle ends (cross section above). The Montgomery, Ala., plant then machines and grinds bearing surfaces to .0005-inch tolerance to produce single-piece, 20,000 pound capacity trailer axles. Trailer operators benefit from higher payloads because . . .

They Throw Away The Holes—And Save Weight

The trick in making a seamless steel tube is piercing a hole in a round of solid steel.

But Pittsburgh Steel Company's Seamless Steel Mechanical Tubing makes the full circle in production of trailer axles at Standard Forge & Axle Co., Montgomery, Ala.

Standard, in effect, throws away the holes by forging the tube ends down to solid steel again, leaving only a hollow steel center and spindle section.

The result: a lightweight, one-piece trailer axle made entirely from a single length of seamless tube—including load bearing wheel spindles, precision ground for bearing and seal seats.

The advantage: assured strength and safety of seamless steel, plus, for example, reduced axle weight for trailer operators in a 20,000 pound capacity axle.

Starting with a seamless steel tube 5" x ½" x 87⅞" for this particular axle, Standard upsets both ends, then swages them down to the shape of a spindle with a 2⅝" solid end.

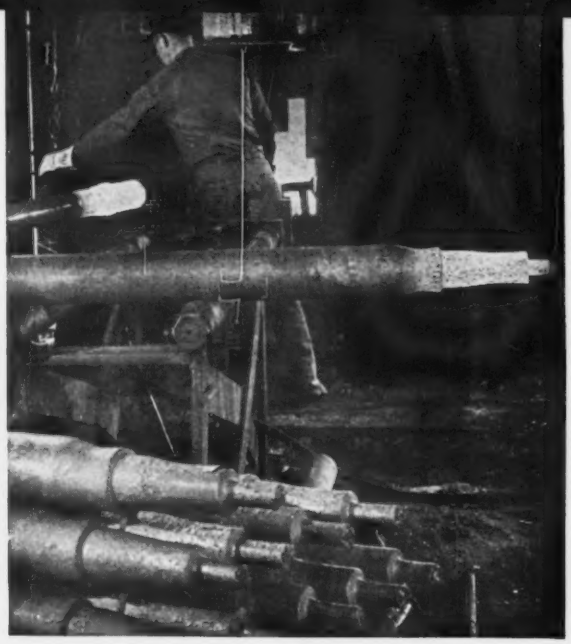
That's deformation of the roughest kind.

But Pittsburgh Seamless Mechanical Tubing takes it in stride, then bounces back under heat treatment with the physical properties required for precision finishing of the critical spindle surfaces, and the toughness necessary for a long life in hard service.

And that kind of performance takes seamless steel tubes with exceptional internal soundness, consistent grain structure, and chemical and dimensional uniformity.

Pittsburgh C-1040 grade Seamless Mechanical Tubing supplies these properties consistently—for this type

After upset, Pittsburgh Seamless Mechanical Tubes, with 5-inch OD and ½-inch wall, are swaged to solid steel spindle shape on drop forge, at right. Standard's heat treating process refines grain, restores toughness of steel.



Standard also produces high-strength inserted spindle trailer axle by inserting forged alloy steel spindle with 4.065-inch OD into 4.040-inch burnished ID of 5-inch seamless steel tube under 50,000-pounds pressure.

Standard Forge & Axle Sales Manager James A. Rumbley says Pittsburgh Steel Company, as longtime major supplier of seamless mechanical tubes, "leaves nothing to be desired in product or service."

axle and for Standard's high-strength inserted spindle type.

James A. Rumbley, Standard's sales manager, says:

"Trailer axles are high-weight carrying members subject to tremendous load shocks. So we use the finest materials available to assure our customers trouble-free service. Seamless steel mechanical tubes help us to do that, with complete safety and at less weight.

"For many years, Pittsburgh Steel Company has been one of our major tubing suppliers. It has left nothing to be desired either in product or service."

That's standard practice with Pittsburgh Steel—whether supplying seamless mechanical tubing to Standard's specific requirements, or to yours. Be certain with Pittsburgh Seamless. Contact one of the district offices listed below.

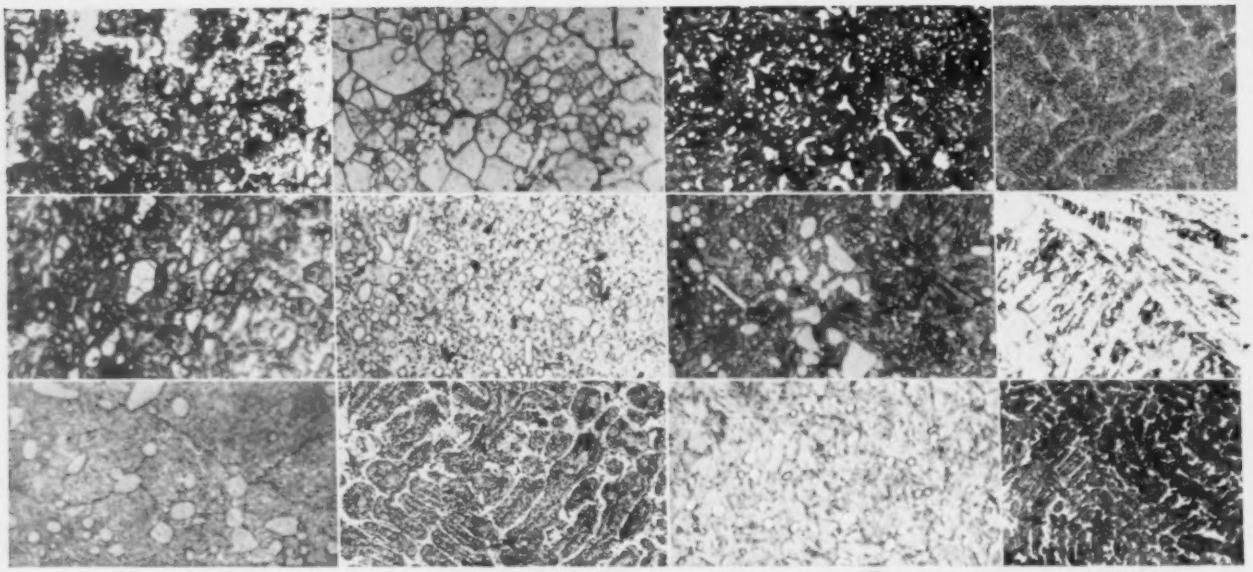
Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
		Houston	Philadelphia	Warren, Ohio

Steel

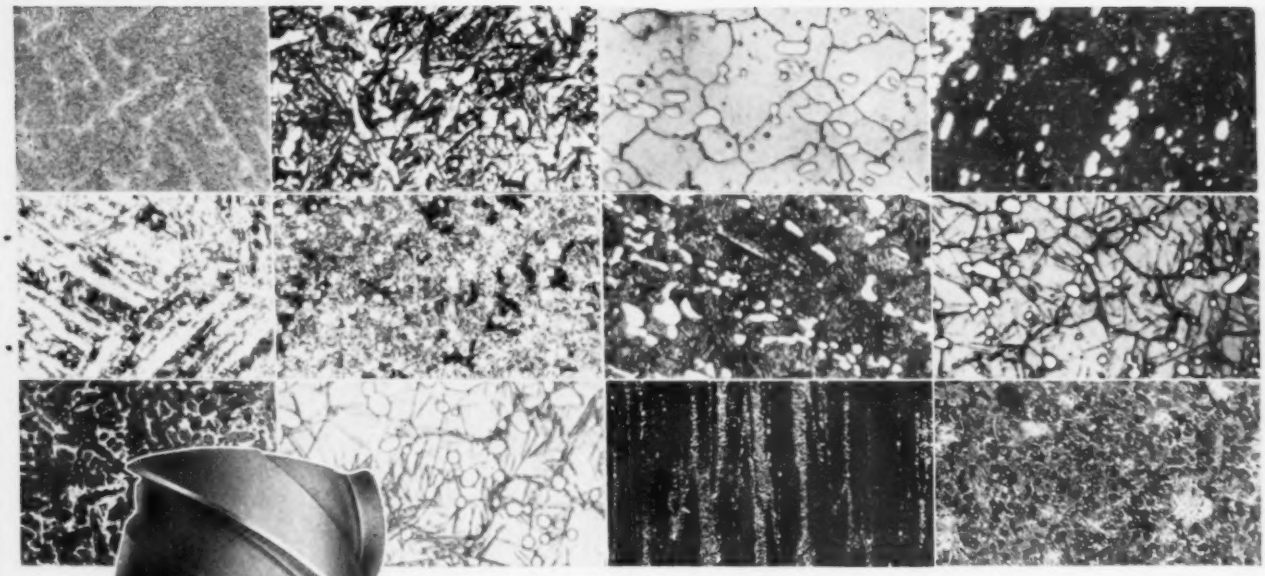


WHICH STEEL

■ It's a good idea to buy cutters from a company that knows

MAKES THE BEST CUTTER?

the answer to this question. These high-speed steels, only a few of those submitted to us each year by the mills, were rejected in our metallurgical department. None of them has the right combination of red-hardness properties, toughness, wear-resistance, hardenability, and stability under heat treatment. Every Barber-Colman cutter, no matter what the size or price, is made from mill-selected tool steels which meet our own metallurgical standards. Every cutter starts in our shop with a complete metallurgical check – not only to determine correctness of ma-

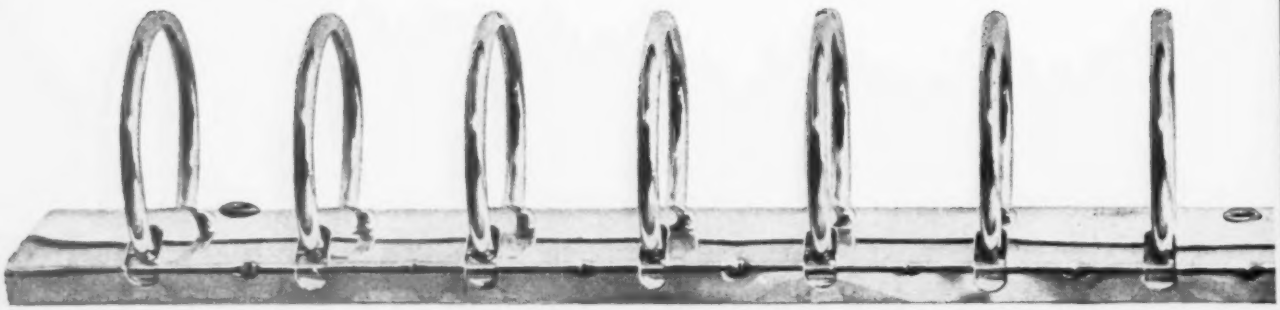


terial, but also to provide data to be used by our engineers and toolmakers in producing the finest possible tools from that material. ■ Look-alike cutters can be miles apart in quality. Your best test is total COST-PER-PIECE, and your best bet is Barber-Colman quality. (Complete range of standard cutters for off-the-shelf delivery.) Ask your Barber-Colman representative for a copy of the hard-cover MILLING CUTTER HANDBOOK – 219 pages of useful information on selection, use, and care of milling cutters. NOTE: Your special cutters receive individual material analysis, selection, and heat treatment if you specify type and hardness of metal to be machined.

BARBER COLMAN

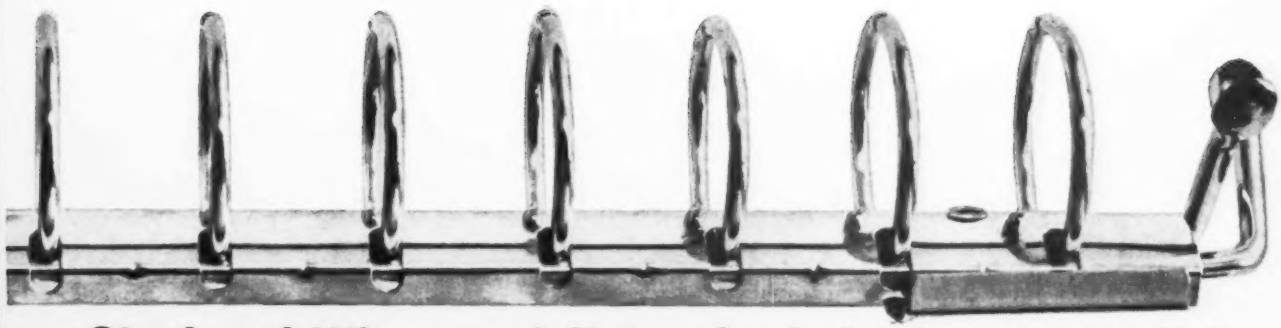
BARBER-COLMAN COMPANY 1110 LOOMIS STREET, ROCKFORD, ILLINOIS

This mark tells you a product is made of modern, dependable Steel.



This is a new kind of ring binder. Below: the American

It opens, closes, and locks the rings, preventing spilled sheets. That's about all a ring binder does. And yet, coming up with the right wire for this binder was more than half a job. National Blank Book Company, Holyoke, Mass., asked our sales representative for an assist. He conferred with Charlie Canney—one of our top service metallurgists. **1.** Charlie met the people at National. **2.** He talked to their production people, came up with a profile of the wire they wanted. It had to have a uniform temper, the right temper for making the binder's snap-action ears, a clean, smooth surface for welding and plating, a temper which would vee-notch cleanly and still be rigid enough to stand distortion during production. **3.** Charlie took his problem back to our Worcester plant, talked it out with Clyde Westhaver, general foreman of cleaning, coating, heat treating; and Fred Brierly, product metallurgist. **4.** And then to the Metallograph—an instrument used in one of the many tests that determine the right properties. **5.** Charlie's report followed. **6.** Next, into limited production on the wire.



Steel and Wire specialists who helped make it click.

Wilfred Blades, quality control supervisor, and Francis Whalen, works metallurgist, kept close check on its condition during the initial draw. **7.** Before shipment, Arthur Weissinger and John Conrad, lab technicians, took stress-strain recordings **8.** The result: a ring binder that works just fine, and another satisfied customer. Call your American Steel and Wire salesman or nearest sales office the next time *you* need a metallurgical assist, or the best wire you can buy. American Steel and Wire, Rockefeller Building, Cleveland 13, Ohio.

Innovators in Wire

USS TRADEMARK

American Steel and Wire
Division of
United States Steel

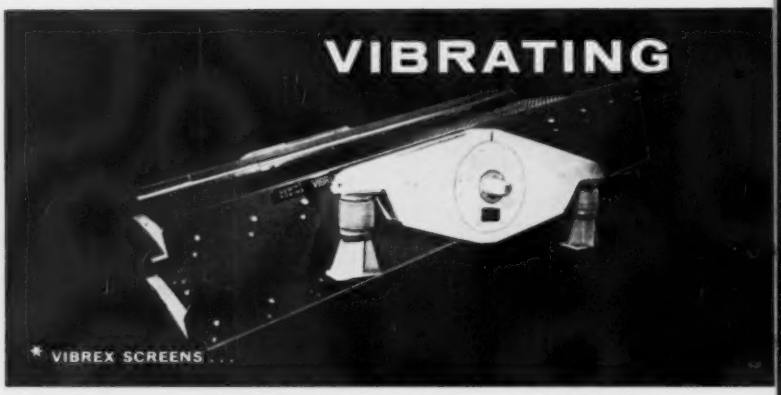
How

THE BROAD H-R LINE

can match your needs exactly...

scalping
sizing
dewatering
washing
feeding
conveying
shaking out

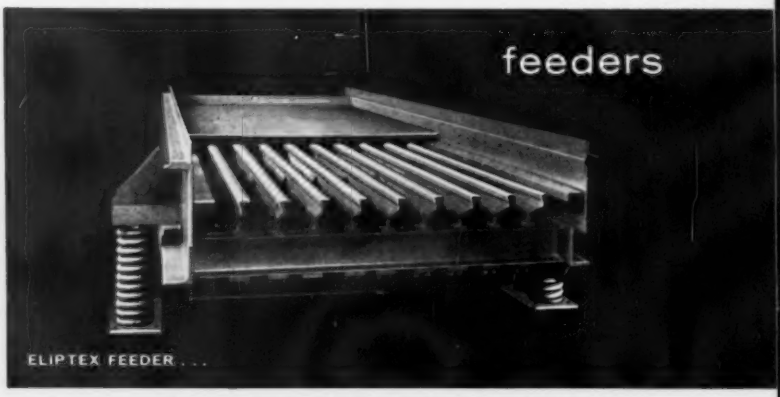
YOUR H-R FIELD ENGINEER CAN SHOW YOU HOW...



Sharp sizing at low cost. Two-bearing, "circle-throw", originated by H-R, is simple and effective. Changing stroke, speed, or angle for different conditions can be easily done in field by your own men. Latest design techniques result in balanced design of all components. Full-floating principle gives smooth, quiet operation. Trunnion yoke and coil spring supports effectively eliminate vibration. Floor-mounted or suspended. Sizes: from 2' x 4' to 8' x 24'. **Bulletin 122D.**

***HIGH SPEED VIBREX . . .**

Fine sizing, washing and dewatering at openings from 10 to 100 mesh. Oil lubricated vibrator has 1/64" thru ¼" stroke range at speeds to 3600 rpm. Adaptable for wide range of materials. Sizes: 3' x 7' and 4' x 7'.



Extra heavy-duty feeder can be combined with scalping by addition of adjustable opening grizzly bar section. Only two main parts: the vibrator and a one-piece pan weldment with or without grizzly section. Variable feed control conveys material from 0 to full capacity. Low discharge height increases conveyor belt life. Coil springs absorb all impact forces. No daily maintenance. Sizes: from 2' x 4' (light duty) to 6' x 30' (heavy duty). **Bulletin 169A.**

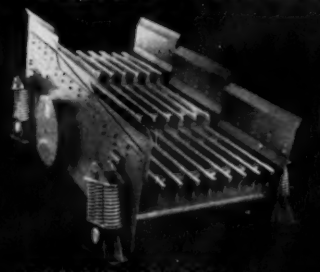
VIBRATING CONVEYORS . . .

Smooth, dependable conveying of practically any material over longer distances for less cost, because Hewitt-Robins balanced vibration principle uses less horsepower than other makes of similar length and capacity. Sizes: from 8" pan width (light duty) to 48" pan width (heavy duty). **Bulletin 135A.**

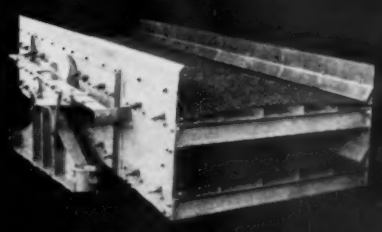
His authority? Over 13,000 Hewitt-Robins vibrating screens, feeders, conveyors and shakeouts are operating in all parts of the world. From this outstanding experience Hewitt-Robins has learned how to design and manufacture vibrating equipment low in upkeep and high in reliability and economy.

An H-R field engineer or distributor is near you. Give him a call or write Hewitt-Robins, Stamford, Connecticut.

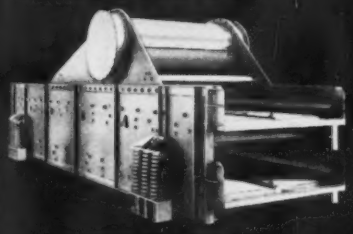
EQUIPMENT... screens dewaterizers



HEAVY DUTY SCALPERS...



* GYREX SCREENS...



* ELIPTEX SCREENS AND DEWATERIZERS...

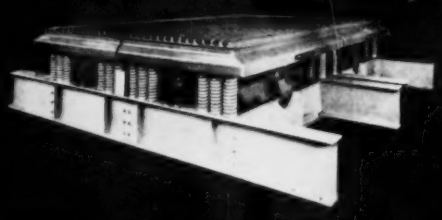
Massive, heavy, rugged. Handles 10,000 lb lumps and up to 54" cubes dropped 7 feet at openings from 2" to 14". Heavy grid frames supported on deep section I-beams with cast steel, perforated plate or grizzly bar decks. ½" thick 24" high skirtboards. Multiple corner coil spring mounting absorbs impact and vibration. Sizes: from 3' x 6' to 8' x 20'. **Bulletin 131.**

Smooth operating, positive stroke vibrating screen with a long operating life. High capacity assured by central vibrator location and easy angle adjustment. Wide range of sizes and styles with one, two, or three decks. Floor-mounted or suspended. Sizes: from 4' x 6' to 6' x 16'. **Bulletin 115B.**

With three-way elliptical motion, sizes, washes, dewaters a wide range of materials with high accuracy and efficiency. Horizontal installation saves space, power, machinery. Special alloy, forged, self-counterweighted, full-width shafts; premium helical gears; full-floating vibration. Low power requirements. Single, double or triple deck units. Floor-mounted or suspended. Sizes: from 3' x 8' to 8' x 24'. **Bulletin 162.**

******All screens available with patented Tension Wedge Outfit.* **Bulletin D-145.**

shakeouts deck preparations



FLOATEX FOUNDRY SHAKEOUTS...

CAR SHAKEOUTS...

DECK PREPARATIONS...

Full-floating principle puts entire load on heavy-duty springs. Less horsepower needed. No live load impact on drive shaft or bearings. No escaping vibration; no damage to supports. Many models and styles available, including self-discharging. From 250 lbs capacity to 100 tons capacity. **Bulletin 124C.**

Reduce from hours to minutes time required to unload bottom dump rail cars. Two main types available: *overhead units* for heavy-duty or general service to unload as few as two cars a day. *Trackside car shakeout:* single unit is designed to unload from one car per week to 8 cars/day. Handles *covered* cars, too. All types push-button-controlled for SAFETY. Require only *one operator.* **Bulletins 163 and 172.**

We offer all types: woven wire cloth: high tonnages, accurate sizing made possible by precision weaving and metallurgical control. Wide variety of sizes, weaves, and materials... **Non-woven preparations:** *perforated plate* in wide variety of materials. Stainless steel profile wire decks of integral panel construction. *Rod decks* of exclusive "Cog-rod" (snap-in) construction or "Loose-rod" construction. *Grizzly decks* with exclusive Vari-grid (movable-bar) design, with cast manganese bars. Immediate shipment from stock on many specifications.

WRITE FOR TECHNICAL BULLETINS.
Complete descriptive and application data available. Write today!

HR HEWITT-ROBINS

Conveyor Machinery and Belting • Power Transmission
Hose • Processing Equipment • Engineering Services

HEWITT-ROBINS
DEPT. 11-42, STAMFORD, CONNECTICUT

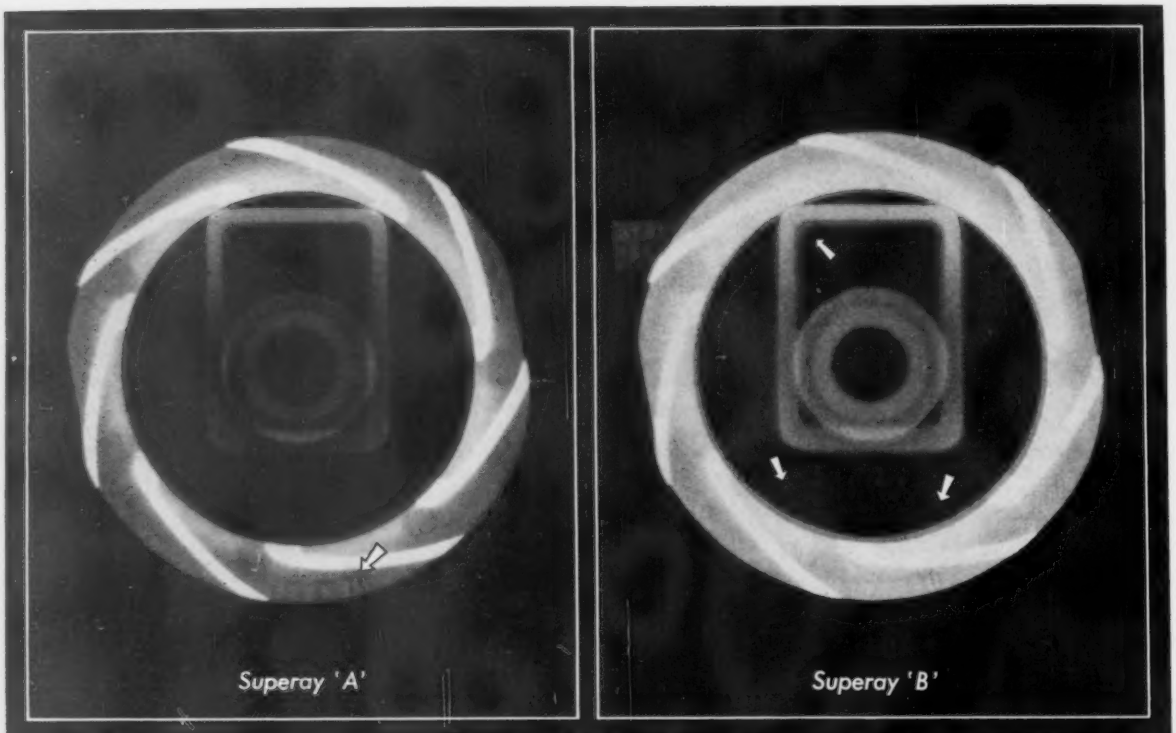
Gentlemen:
Please send me the following bulletins at no charge:

☐ 115B ☐ 122D ☐ 124C ☐ 131 ☐ 135A ☐ 162 ☐ 163 172 ☐ 169A ☐ D145

Signed_____ Title_____

Company_____

Address_____



The two radiographs of a multiple thickness aluminum casting (minimum to maximum thickness—1 inch) were exposed simultaneously on Superay® 'A' and Superay 'B' X-ray film in a Sandwich Pak. Defects in thinner portions were recorded on Superay 'B' (the slower film). Shrinkage and inclusions in thicker sections were recorded on the faster film (Superay 'A'). Both films developed for 6 minutes in Ansco Liquadol at 68°.

Ansco Sandwich Pak cuts X-ray time in half!

MULTIPLE THICKNESS CASTINGS X-RAYED WITH ONE EXPOSURE! ELIMINATES DARKROOM LOADING!

Ansco Sandwich Pak is a single unit package for daylight handling... made up of one sheet of Superay 'A' Film sandwiched with one sheet of Ansco Superay 'B' Film. Ideal for obtaining maximum readability in radiographs of multiple thickness parts with a single exposure. Especially useful for low energy work where parts must be radiographed in quantity.

- **Cuts set-up time in half.**
- **Eliminates darkroom loading and film holders.**
- **Increases latitude of any given exposure.**
- **Lightweight, flexible (can be taped to part).**
- **Factory sealed against dust, dirt.**

Ansco, Binghamton, N.Y.
A Division of General Aniline and Film Corporation

Ansco
X-ray

Strong Restraining Influences...

Roebling Hose Reinforcing Wire

Roebling Hose Wire, Hose Reinforcing Wire and Hose Wrapping Wire bear the stamp of Roebling's strict attention to constant uniformity. As with all Roebling wire products, each is wholly Roebling-made and Roebling-controlled, from open hearth to packaging. Tensile strength and forming qualities, finish and gage are of an excellence that proves itself in use.

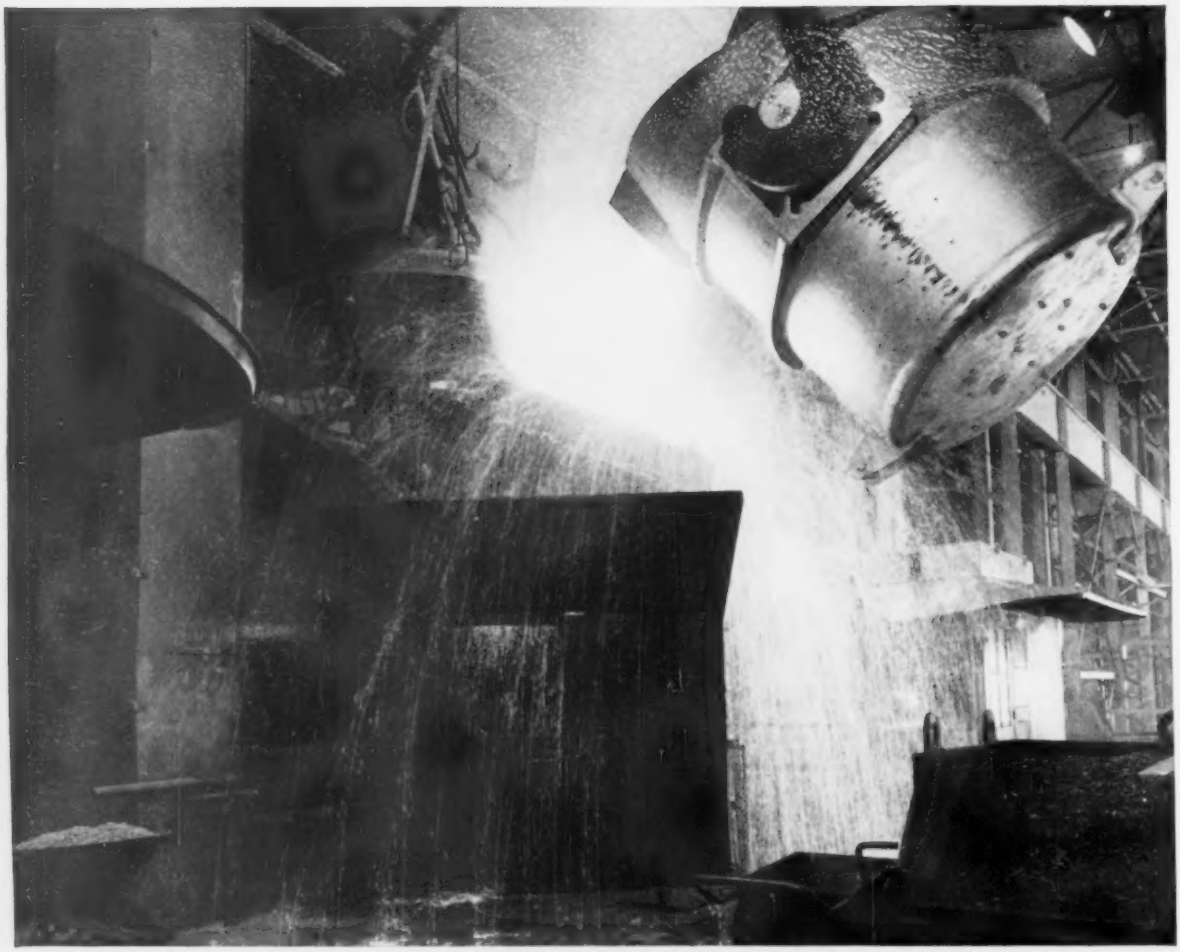
Resistance to internal and external pressures and wear are what you look for in hose wires and what you pay for. With Roebling, you *get* them.

For further information on these and other Roebling quality products, write or call Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

Roebling...Your Product is better for it

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation



Seventy-ton ladle takes molten iron from Whiting continuous hot blast cupolas and pours it into converters.

It's Foxboro control for giant new Acme steel plant

Hot Blast Cupolas have capacity of 50 tons per hr.– operate continuously

Cupolas 67 ft. high by 10 ft. in diameter – the world's largest – are under Foxboro control at Acme Steel's new 35 million dollar plant at Riverdale, Illinois.

To keep hot blast cupolas operating at peak efficiency, Acme depends on Foxboro instrumentation. Foxboro temperature, pressure and flow recorders and controllers to keep air leaving preheaters at a constant 1200F. And Foxboro Air Weight Controllers, that meter blast air by weight instead of volume,to help cut fuel costs.

Furnaces, cupolas, preheaters — you'll find Foxboro instruments help operate them all more efficiently. Ask your nearby Foxboro Field Engineer for recommendations for your plant. Or write direct for a copy of Bulletin 13-18. The Foxboro Company, 8011 Neponset Ave., Foxboro, Massachusetts.

Small-case Foxboro Consotrol* instruments (foreground) record and control preheater pressures, temperatures, flows. Preheaters were designed by Fabricating Engineering Co., Inc. *Reg. U. S. Pat. Off.*

FOXBORO

REG. U. S. PAT. OFF.

STEEL GUARDS YOUR LIFE

Zinc Guards Steel's Life

From coast-to-coast, galvanized steel guard rails are making our highways safer.

The resilient strength of steel, plus its relatively low cost, makes it the most successful material for keeping vehicles where they belong, on the highway. Aluminum costs more and does not have steel's strength. Concrete barriers are also more expensive and lack steel's shock-absorbing resiliency.

As steel saves human life, zinc saves steel's life. The galvanized zinc coating defeats steel's only enemy — corrosion. Under violent impact, the tough, adherent zinc surface "gives" with the steel and, unlike paint, continues to protect by sacrificial action even when gouged through.

▲ Galvanized steel guard rail divider recently installed on the Pasadena Freeway, California.

◀ Galvanized steel guard rail is used on the Westchester Expressway which links the Connecticut Turnpike with the New York State Thruway.

— And The ZINC For The Job —

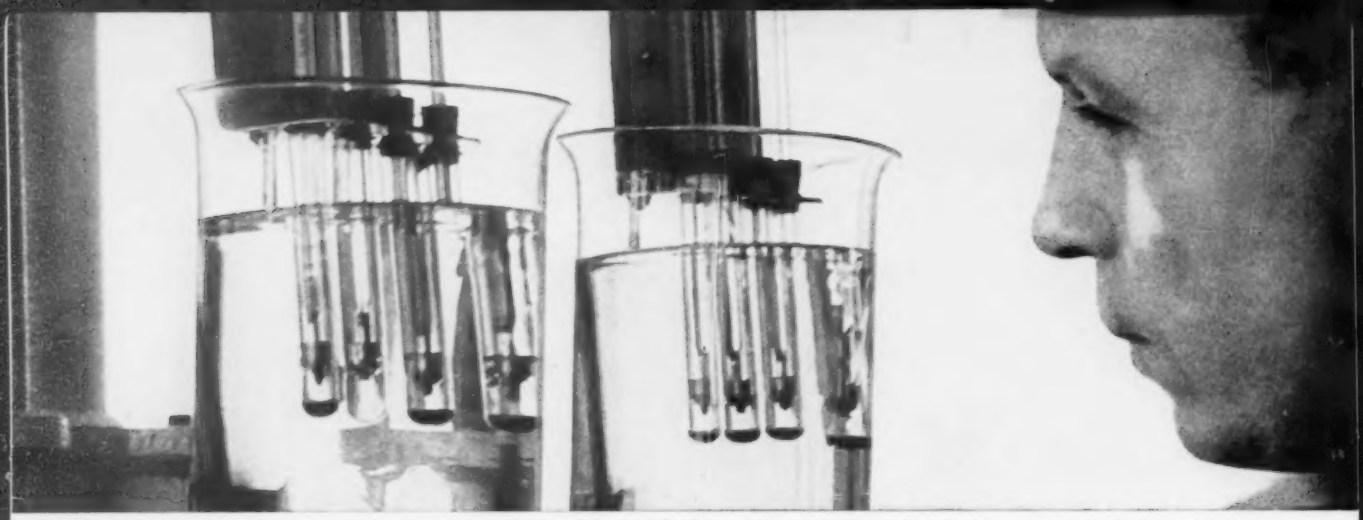
ST. JOE

Aluminum guard rail on the Long Island Expressway was broken by collision impact.

ZN-199

ST. JOSEPH LEAD COMPANY

250 PARK AVENUE • NEW YORK 17, NEW YORK



Dropping point test shows how greases react to heat. Beaker fluid has been heated to 390°F. All greases tested except Darina (second tube from left) have passed from solid to liquid state.

BULLETIN:

Shell reveals the remarkable new component in Darina Grease that helps it save up to 35% on grease and labor costs

Darina® Grease is made with Microgel*, the new thickening agent developed by Shell Research.

Darina lubricates effectively at temperatures 100° hotter than most conventional soap base greases can withstand.

Read how this new multi-purpose industrial grease can help solve your lubricating problems and even save you up to 35% on grease and labor costs.

THERE IS no soap in Darina Grease. No soap to melt away—wash away—or dissolve away.

Instead of soap, Darina uses Microgel—a grease component developed by Shell Research.

What Microgel does

Because of Microgel, Darina has no melting point. It won't run out of gears or bearings.

Compared with most conventional soap-base greases, Darina provides significantly greater protection under adverse service conditions.

Mix water into Darina and the grease does not soften. It shrugs off water—won't emulsify.

Resists heat

Darina will withstand operating temperatures 100° hotter than most conventional multi-purpose greases. It cuts leakage and reduces the need for special high-temperature greases.

Also, Darina resists slumping, thus forming a more effective seal against foreign matter.

Saves money

Shell Darina can reduce maintenance expenses while it protects your machinery. Savings of up to 35% on grease and labor are quite possible.

In some cases lubrication intervals have been extended to double what they were before. Less grease is consumed and less time consumed applying it.

For details, see your Shell Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, New York.

*Registered Trademark

SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are helping to provide better products for industry

SOME OF THE LARGEST STEEL USERS have notified suppliers they will start hedging against a steel strike shortly after the first of the year. Some have indicated they intend to build as much as 90 days' inventory. This was not unexpected, but it provides the first real hint of the extent of the pre-negotiation buildup. By February, steel will be hard to get and lead times will be far out. Inevitable result: Late comers will get hurt.

TOOL AND DIE PRICES AND LEAD TIMES are under pressure. Prices may go up in the next few months. And promises on delivery time for this equipment may stretch out between now and spring. The trouble is due to lower shop capacities and bigger winter order volume. Many shops have gone out of business. In the offing: More overtime and higher costs.

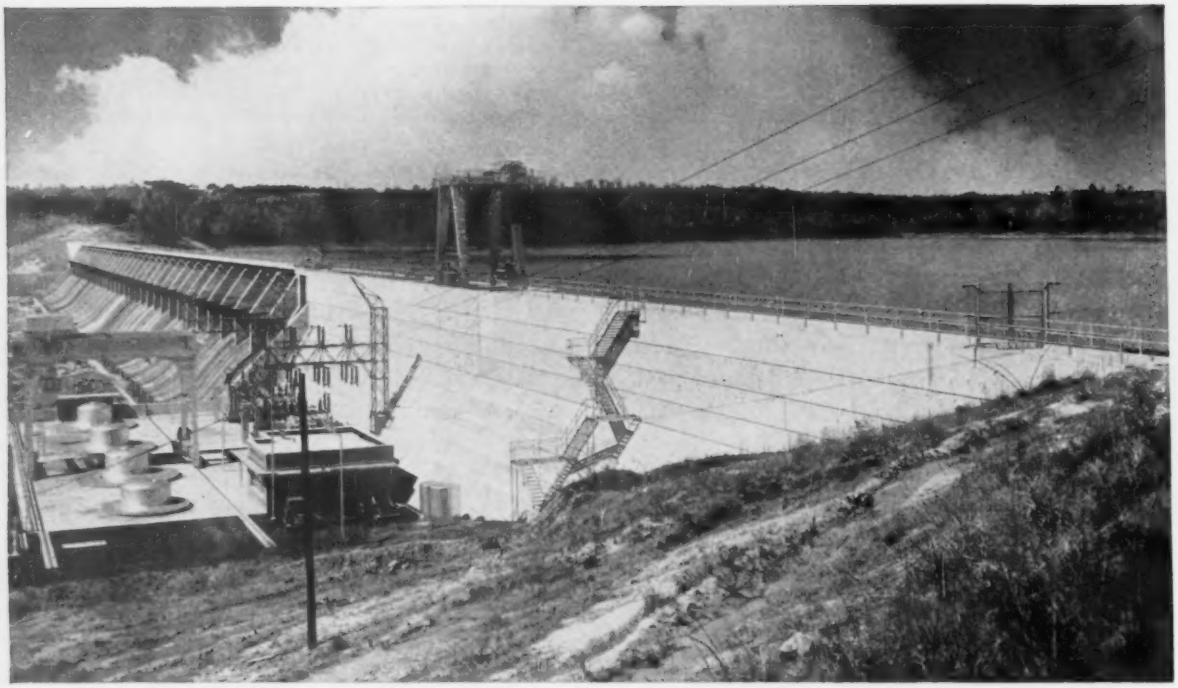
A BIG YEAR FOR AUTO PRODUCTION is forecast for 1962 by Value Line, an investment service. In one of the first forecasts for the new auto year, an 18 pct increase in production to 6.5 million units is predicted.

A SHIFT IN INVENTORY POSITIONS is noted by buyers in the October survey of members of the National Assn. of Purchasing Agents. Some 27 pct report higher inventory levels, up from 23 pct last month. Overall, a "small degree of accumulation" is noted. In prices, the group paying "higher" prices outnumbers by 2 to 1 those paying "lower" prices.

PRESS SALES ARE DISAPPOINTING some builders. The upward sales movement is at a "substantially" less rapid pace than had been expected. The machine tool surge in September was expected to boost slower moving press lines like hydraulic equipment. The long-range forecast continues strong.

THE FARM EQUIPMENT OUTLOOK HAS BRIGHTENED. Some crops are coming in such volume as to create localized and temporary rail car shortages. This boosts the first half 1962 sales outlook. That is when much of the surplus income will be spent.

APPLIANCE MANUFACTURERS SHIPPED MORE automatic washers during September than in any previous September in history. Some 323,000 units were shipped in the month. This showing is second only to the record month in October, 1956, when 350,000 units were sold.



At New 60,000 KW Oliver Dam... Four Dependable Farval Systems Protect Vital Turbine Bearings

On this important, new hydro-electric installation at Columbus, Georgia, Farval Dualine Centralized Lubrication Systems guard against bearing failure — keep turbines in top-notch operating condition. With Farval on the job all bearings receive a measured quantity of the right lubricant injected under pressure at predetermined time intervals.

Leading Hydro-Electric engineers after using Farval for over a quarter-century, report:

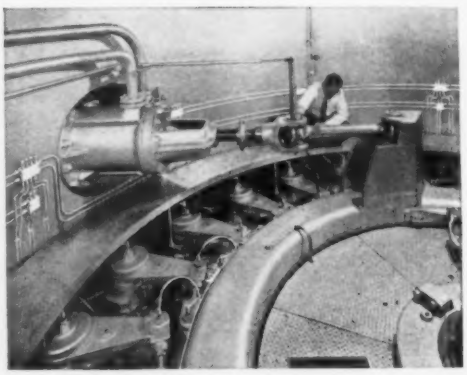
• Costly down time due to bearing failure is eliminated • Sizeable savings in both lubricant and maintenance are realized • Turbine life prolonged • Plant housekeeping improved

They further tell us their turbines run smoothly — operate efficiently at full rated capacity for long periods of time. That's because Farval positively removes all lubrication guess work.

Hit-or-miss hand lubrication takes many man hours to reach each bearing with a grease gun. It results in excessive waste of lubricant, as well as running up expensive labor charges. Furthermore, important bearings might be *missed entirely* — or receive too little or too much lubricant.

More and more, designers, engineers and production people are turning to Farval for the kind of lubrication that spells uninterrupted, maintenance-free operation.

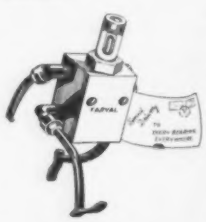
Write today for our newest free illustrated literature which tells the "Farval Story", or contact your local Farval representative for the complete facts.



In one of the Oliver Dam turbine pits, a single Farval Automatic Lubricating System serves operating arms linkage, shifting ring and gate stem bearings.

Farval Studies in Centralized Lubrication No. 258.

Farval Division
Eaton Manufacturing Company
3291 East 80th Street • Cleveland 4, Ohio



NEW TWIST: "The Twist" may be a new dance craze but to truck engineers it's a torsion course for new vehicles.

Truck Engineers Boost Payload By Cutting Weight, Fuel

Lightweight metals, plastics vie with stronger steels In "Battle of the Ounces."

Truck builders also experiment with new engines.
By T. M. Rohan

■ "I can remember when if we took 100 lb off the weight of a highway truck we were big heroes. Now we are fighting for ounces. Every ounce saved is an ounce more payload and we are in a highly competitive business."

For highway truck builders and their thousands of suppliers, these words of Harley Harris, truck and parts buyer for a huge Cleveland trucking organization with more than 90 subsidiary firms across the country, are the look of the future. Mr. Harris is president of Supplies, Inc., a subsidiary of Leaseway Transportation Corp., Cleveland, which operates well over 7700 vehicles.

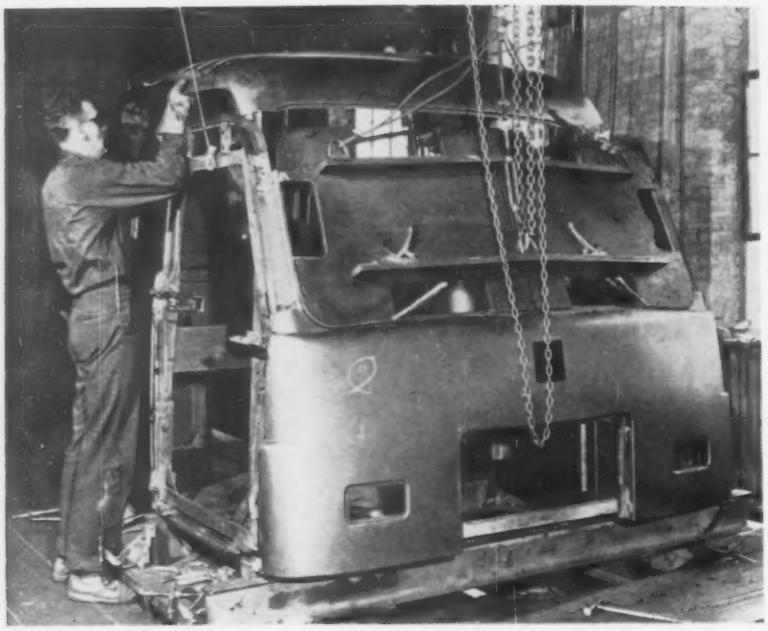
"The lighter weight trucks are getting more and more important with us and we are constantly looking into newer high-strength materials for them," says John Wagner, a top design engineer at International Harvester's Motor Truck Div., Fort Wayne, Ind. He adds:

Strength vs. Weight — "We and other firms have just about standardized now on high heat-treated steel rails which cost more but lighten up the truck. Better engineering is also a prime target to increase the strength-weight ratio, but within a very tight framework of cost justification. This is especially true for trucks hauling bulk products such as oil or concrete mixers where every pound counts."

For tractor and trailer builders and their suppliers, the challenge is clear. Behind the scenes, the battle is being fought for the slightest advantage. Carbon steel is fighting aluminum and fiberglass; high strength alloy steel is fighting both; diesel engines on heavy trucks are pushing gasoline engines into the background and the gas turbine warming up on the sidelines is eager to jump into the fray.

Air suspension systems are vying with leaf and coil springs. Lifetime bearings, sealed cooling systems and fewer oil changes are already on the scene. And in a hundred areas, heavy trucks parts makers find the trend is toward much closer tolerances and inspection methods, higher quality and more costly materials.

Fierce Competition—Competition will get more fierce as trucking firms bear an increased load of the federal highway building program, fend off railroad competition and



ALUMINUM ROOF: Roof is lifted into place on sleeper cab unit made by McLaughlin Body Co. for International Harvester. Roof is made from sheet of aluminum-killed, drawing-quality steel from Jones & Laughlin.

"piggybacking" and fight higher labor and equipment costs.

The hottest development area is in heavy highway trucks for contract hauling bulk materials on a regular run. Here every ounce of truck weight saved is an ounce more payload within the legal cage of weight limits in which they must operate. General haulers are also interested but to a lesser extent, since infrequently they are able to operate at full load.

Saving weight on tractor bodies and trailers is not simply a question of substituting lighter material (at about $7,000 higher). Tractors have had aluminum frames and fiberglass cabs and fenders. But some of the earliest all-aluminum trailers for bulk material cracked down the middle from an over-eager design.

Bad Publicity—Early forged aluminum wheels broke on the road, causing accidents and widely-publicized lawsuits which have given them a bad name, still difficult to overcome. Newer forged aluminum wheels are greatly improved, still cost twice as much as steel, but save up to 666 lb on an 18 wheel rig and also help extend tire life.

Some of the biggest developments in heavy truck building for which suppliers will have to adjust their sights are in engines.

The gas turbine for trucks is still a long-shot because of high fuel consumption. The pioneering Boeing gas turbine truck got about 1 mile per gallon and was refined up to about 2 mpg, while normally loaded highway trucks get about 5 to 7 mpg. But much lower maintenance costs on turbines, like airlines are getting on jets, could be a big plus factor. Earliest breakthrough probably will be on long hauls with heaviest loads.

Fire Trucks—Tiny Boeing gas turbines weighing only 335 lb are used in fire trucks in Seattle and San Francisco where they go roaring up steep hills with ease, take off like a jackrabbit and need no warm-up.

Free piston engines for trucks have been built experimentally but are inactive lately. The fuel cell is an even longer shot than the jet engine.

Meanwhile diesel engines have about 90 pct of the heavy truck business and are pushing gas engine builders to accelerate development for a comeback. V-6 diesels are in use; aluminum diesels are a strong possibility.

Better Engine—"If we could get a better engine at a reasonably higher cost, it would be the best investment we could possibly make," says Harley Harris.

The workhouse diesel tractors now travel regularly 250,000 miles before an overhaul compared with about 100,000 miles for gas engines. Diesels have superchargers and every other known hot rod accessory. But their biggest drawback is still lack of "pep"—so they are burdened with 12-speed transmissions. And drivers often have to shift a dozen times in a mile to avoid lugging. Gas engine trucks can get by comfortably with an 8-speed transmission, but are generally used within cities and for short runs.

The automatic truck transmission which would be easier on the driver was announced with a big splash several years ago but has laid an egg because of 30 pct greater fuel consumption. In busses, however, it is a big success.

Jet Engine—Some forward thinkers like Mr. Wagner at International Harvester feel that the jet engine has a chance in the truck field if it can operate 650,000 miles or more. And absence of a water cooling system is an extra advantage.

"One other concept of truck trains holds promise for the 1970's, particularly if regulations on the Interstate System permit weights and lengths beyond those required for double bottoms," Wagner said in an SAE speech early this year. As he sees it:

"The power needs of longer trains would seem to indicate gas turbines, since diesel dimensions would tend to become impractical with large horsepower increases. On the other hand, if the individual units of the trailer train were to be self-propelled and remotely-controlled from the lead unit, the power problem would

have still another solution. Smaller engines might be sufficient. They also might be uncoupled at terminal points and units driven individually to different destinations."

Compromise Needed—For single turbine operation, Mr. Wagner feels, turbines would have to be in the 500 to 800 hp range (small for them). Diesels are now up to the 375 hp range, so a compromise would be necessary. But the truck-train would probably be the first feasible use.

In the tractor, itself, the greatest emphasis is on shortening the wheelbase to accommodate longer trailers and still stay within legal length limits. Power is also constantly being added wherever possible but every ounce must justify itself.

For every foot of length we can save on a tractor, the trucker can add about 750 lb of payload or cubic area—and this is money in the bank," says one leading designer. He added:

"We are in a constant struggle to cut the length of cabs. In our latest model we have cut the distance between the front bumper and back of the cab to 50 inches, yet the tractor will pull the heaviest and largest legal load in any state.

At White Motor Co., Cleveland, a top engineer says: "Our industry now uses aluminum frames, valve covers, flywheel housings and similar parts, although it costs about $1 extra per pound saved. Fiberglass cabs and fenders also save several hundred pounds. One customer wanted the lightest truck we could make so he could put on big fuel tanks and save a few cents a gallon buying fuel at one particular spot along a route."

One new heavy duty truck recently introduced by a builder saved 1100 lb chassis weight. Frames are made of heat-treated high strength alloy steel, which eliminates considerable bracing. Fiberglass cab and fenders all help, as does lavish use of aluminum. Parts made from aluminum include hood, air tank, grill, exhaust pipe, crank and transmission cases, air compressor cases, front cross member, radiator mounts and various engine parts and brackets. Total tractor weight is about 9500 lb, permitting a 50,000 lb trailer and payload within a total 60,000 lb gross cargo weight.

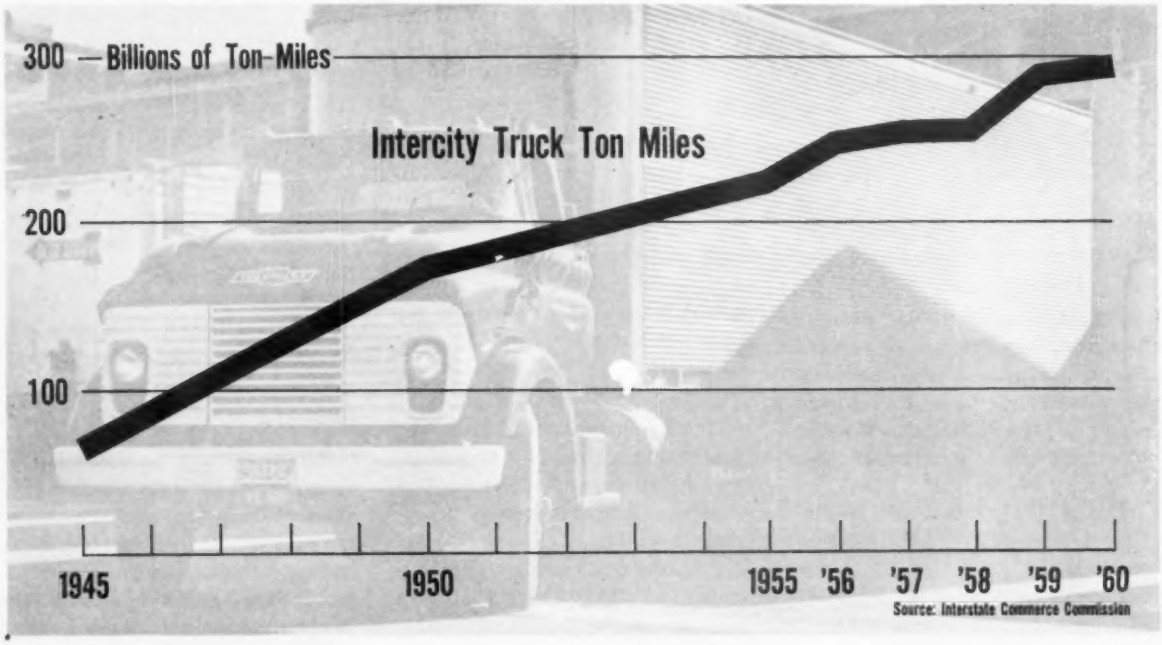
Some tests with experimental trucks are quite tedious. At International Harvester, Fort Wayne, Ind., some experimental trucks are driven continuously around the clock on a closed track for a million miles.

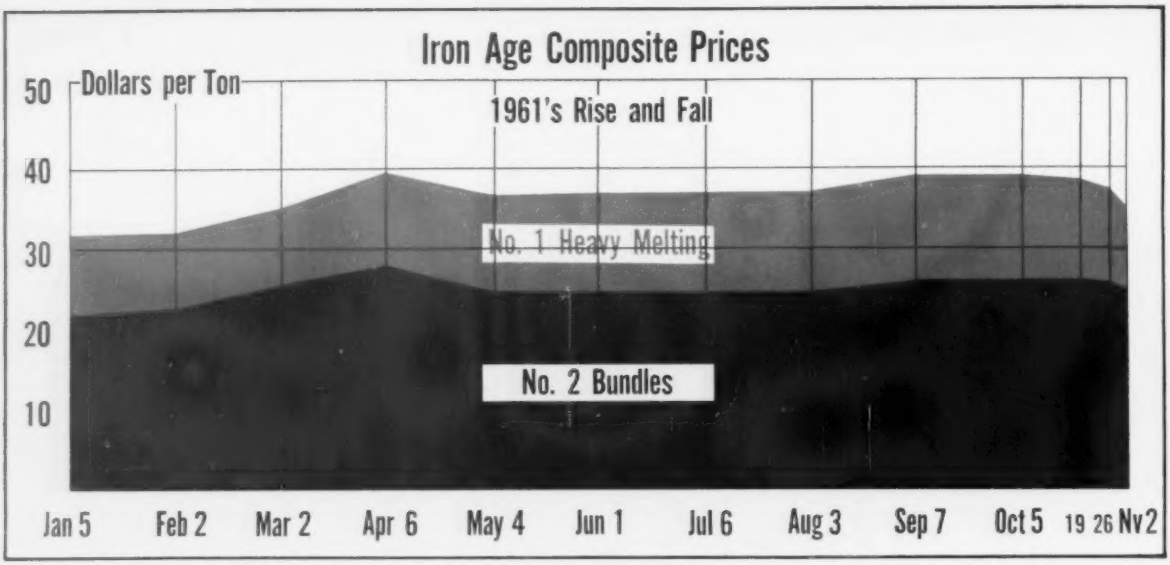
Twist Course—There is also a stretch of teeth-rattling Belgian block road over which newly designed trucks are driven 500 or 1000 times to shake anything loose that's going to come loose. New units must also weather the "twist course" (see cover) hundreds of times. Here a thousand problems come out into the open and can be changed before going into the field.

Fans have gone through radiators, throttles have jammed open or closed, brakes or clutches can bind or loosen and tires rub. Tandem rear axles slither over the peaks and valleys and front axles go into unbelievable contortions. In earlier days, trucks were driven into trees to see if the frame held together.

Probably the biggest area for money saving is in the trailer—but only when there is a high-density load, generally bulk liquids or material.

Why Weight Savings Mean Big Cost Savings





Scrap Outlook: Long, Cold Winter

Scrap dealers and brokers feel the worst is yet to come as the market falls.

Most feel prices will go on falling, with no chance for improvement until January. Others are more pessimistic.

■ While the rest of the economy climbs back from the recession doldrums, the scrap market plunges in the opposite direction.

Prices have been falling for six weeks, after eight months of stability. And the bottom is nowhere in sight. Dealers and brokers don't look for any real improvement until late in the first quarter of '62.

Recent regional price declines have been the sharpest in modern scrap history. And many dealers feel the worst is yet to come. National consensus: It will be January before any improvement is noted, if then.

What's Behind It — The export market has collapsed. That's one of the major factors behind the slump. For with export dried up, big scrap dealers are turning to domestic business and competition is knocking down prices.

Near absence of any mill buying has also stripped the market of any semblance of a price floor. A Pittsburgh mill recently put on a blast furnace, expecting fourth quarter demand. When it didn't come, the mill balked at shutting down the furnace for a few weeks. "We'd like to be buying at these prices," says the scrap buyer, "but we have to use the hot metal."

"Demoralized" Market—Brokers in Chicago use terms like "demoralized" and "distressed" to describe the worst market shakeout in over a decade. Some buyers feel export isn't the major factor. But many brokers who were strongest in the export market were low bidders on November factory lists, or not bidding at all.

The steel industry has increased blast furnace output in every month since February, with the exception of July. There has been little increase in steel production since May. Steelmakers made less steel in September, but 300,000 tons more of iron, than they did in May.

Heavy Lists—The hot metal excess developed just as heavy tonnages of industrial railroad scrap hit the market.

A Pittsburgh stamping plant offered 6000 tons of bundles late in October, first big list in months. One of the largest railroads did not sell any scrap in September and came out with an extra large offering in October.

Big disappointment in Pittsburgh is not so much price, as volume. Brokers and dealers have been waiting for months for U. S. Steel Corp. and Jones & Laughlin Steel Corp. to come into the market. The steel upswing ran out of gas just when there were hopes for increased demand.

In Philadelphia, one large mill hasn't bought any scrap since September. Another mill took three furnaces off last week.

Bleak Outlook — With Japan's economic slowdown and dollar shortage, and the general export collapse, dealers figure one factor can reverse the downward scrap trend: Stockpiling against a mid-summer steel strike.

Competition Hit Steel Profits

Sales Battle Reflected in 3rd Quarter Earnings

A gradual improvement is forecast after an average third quarter earnings performance.

Competition of the roughest nature characterizes the market and rules out price increases.

■ Steel company earnings in the third quarter reflect a disappointment in the rate of improvement. This is compounded by a competitive situation that affected even the biggest in the industry.

Three months ago, most steelmen predicted a much bigger return for the third quarter. But the hoped-for business just did not materialize. The result: Of 20 major companies tabulated here (see table) 11 of them failed to improve over their second quarter performance.

How Competitive—This group included U. S. Steel Corp. The Corporation's comparatively poor performance in the quarter even prompted questions at the quarterly press conference over U. S. Steel's share of the market.

"I think you'll find U. S. Steel will be competitive," returned Roger M. Blough, chairman of the board.

While this is far from conclusive, it indicates the bitter sales battle now going on in the industry. And the companies that have not matched the competition in sales and marketing have suffered in sales.

While competition within the industry did hurt to some extent, the failure of the third quarter to result in a big boost in production and sales was a surprise to many.

Price Factors—Further, the failure of a major upturn to materialize spelled an end to any hopes that the Oct. 1 wage increase could be followed up by a steel price increase. Industry leaders are unanimous that the market now would not support a price increase.

But most steel leaders believe that higher prices are needed, and indicate they will come, eventually.

"While prices are, and should be, determined only by competitive market conditions, we believe, based on the need for more adequate profits, a good case can be made for higher steel prices in the public interest," declared Joseph L. Block, chairman of Inland Steel Co.

In one way or another, most executives voiced similar opinions.

Auto Strikes Hurt—On the disappointing sales returns of the third quarter, the series of auto strikes at General Motors and Ford absorbed most of the blame. But other big steel using industries failed to come up to expectations. The railroads, for example, are still out of the market. Construction also disappointed.

As the steel companies reported their third quarter earnings, the market began to take on a different tone. Mr. Blough noted a better tone in new orders only in the past week. Across the industry, the order rate began to pick up about 10 days ago after several weeks of a stalled upturn.

Hedging Starts—The better outlook for the fourth quarter was bolstered by indications from automakers and other steel users that they would be building inventory in the first half of next year as a hedge against a steel strike. Some inventory estimates are as high as 90 days.

On the labor outlook, there was little to add to the record.

Said Mr. Blough: "I would hope that negotiations would be peacefully and expeditiously concluded and that the settlement would be in the interest of all segments of the industry. This means a negotiated settlement on a basis that doesn't put the entire steel industry at a competitive disadvantage."

Third Quarter Steel Earnings

Not Up to Previous Expectations

COMPANY	THIRD QUARTER 1961	SECOND QUARTER 1961	THIRD QUARTER 1960
U. S. Steel	$51,757,122	$59,027,471	$52,415,599
Bethlehem	33,943,023	25,996,185	12,436,106
Armco	14,513,437	13,915,522	11,693,836
Inland	14,441,290	13,605,988	5,135,369
Republic	12,702,513	15,431,357	7,310,271
Jones & Laughlin	10,102,000	9,240,000	3,483,000
Kaiser	7,679,572	6,269,686	5,802,364*
National	7,009,951	10,302,140	8,061,074
Youngstown Sheet & Tube	5,146,532	8,163,845	2,676,626
Lukens	2,564,050	1,378,000	3,325,768
Allegheny-Ludlum	2,486,603	2,860,892	647,902
McLouth Steel	2,142,572	4,991,476	3,445,658
Wheeling	2,050,000	2,127,000	558,000
Granite City	1,939,125	2,627,530	1,783,858
Universal-Cyclops	841,750	1,502,382	537,428
Colorado Fuel & Iron	710,432	1,856,605	5,615,161
Detroit Steel	618,893	418,086	100,533
Crucible Steel	532,000	149,000	1,826,000*
Alan Wood	416,832*	151,781	82,018*
Pittsburgh Steel	255,634	208,285*	671,040*

* Net loss.

British Steel on March

Visiting English steelmakers say their industry is geared for competitive race.

Central location, cheaper ore and water routes to customers are big advantages.

By G. J. McManus

■ British steelmakers move toward open competition in the world market with the historic assets of their nation plus important new ones.

England's mills are favored by a strategic location. They have a mature tradition of teamwork coupled with new technical boldness. In a period of rapid change, they also have some of the problems that go with maturity and long stability.

These points were made in a recent Pittsburgh stop-over of a touring group from the Iron and Steel Institute of London. With their nation now up for admission in the common market bloc, visiting steel men talked candidly about prospects.

Competitive—"We're at the center of gravity," said Sir Charles Goodeve, president of the institute. He explained the British Isles were still uniquely favored by a central location with water transportation to major markets and material sources.

"Our costs are about the same as yours," said Sir Charles. Cheaper transportation would give England an edge in many markets, he indicated.

For iron ore, he said, Great Britain can shop on the world markets for the best price; it has been able in recent times to buy below American levels. Coal is relatively expensive for British mills, with American imports restricted by tariffs.

Cooperation—The nation's steel mills have displayed a fairly solid front on matters like pricing, scrap costs and inefficient operations.

On steel prices, the government sets a ceiling but there is no floor. Despite a recent weakening in demand, there has been no serious cutting, says Sir Charles.

Regarding inefficiency, the British industry has taken a tough line on plants considered unsound. With competition for mass markets in the offing, there has been a conscious effort to consolidate steelmaking in tonnage facilities. At the same time, scrap prices have been kept low in the United Kingdom by "various dodges."

Fewer Plants—To promote concentration in this situation, the industry and the government have systematically choked off smaller plants. This has been done by discouraging investment. Unless a project has the blessing of the private steel federation and the government steel board, financing is difficult and costly.

The effect, said Sir Charles, has been to "accelerate what economics would do anyway." The number of steel companies in England has been reduced 25 pct in recent years. While this has been happening, total capacity has increased rapidly. With 30 million tons now installed, Britain has doubled its steelmaking capacity since the war. There are firm commitments for another 6 million tons.

Technical Progress—Sir Charles points out there is no stodginess in the industry's technical program. Every type of basic oxygen plant is being tried, including Kaldo and LD. Ten continuous casting machines are in service or under construction. England is building the first free world mill that will depend entirely on casting.

British steel men say they are tied in knots by craft union practices that have hardened over 600 years. Customs handed down from father to son add up to 2½ times the labor required for a ton of American steel.

This excess eats up the advantage of wage rates that are roughly one-third the American average.

BRITISH STEELMAKER: Sir Charles Goodeve, president of Iron and Steel Institute of London, says his industry is streamlined and ready for world trade competition. But he admits to problems.

Moon Probers Also Eye Oceans

Sea Floor Secrets May Be Bared

Similar problems may exist in exploring the surface of the moon and the bottom of the sea.

If solved, mining of tons of aquatic minerals may be near.
By F. J. Starin

■ In a few years the oceans that cover three-fourths of the earth will begin giving up secrets they have been holding for centuries.

And shortly afterwards the seas will start yielding commercial tonnages of minerals—probably manganese, nickel, copper and nonmetallics at first.

Why has this oldest of frontiers suddenly become the new frontier most likely to be conquered? For the first time in history, sufficient technology, time, talent and money are being concentrated on all the problems that must be solved to tap the vast wealth under the sea.

Aluminum Submarine—The main problem is charting the bottom of the sea. Reynolds Metals Co. has invested $2 million to have an aluminum submarine built that will be able to reach 60 pct of the ocean bottoms throughout the world.

This, points out Reynolds, is greater than the entire land mass on earth and about 5 times the surface of the moon.

Electric Boat Div., General Dynamics, will build this Aluminaut, and the Woods Hole Oceanographic Institute will lease it for undersea exploration. That Reynolds has mining in mind is made quite clear by J. Louis Reynolds, who heads the company's international operations. "When you think that three-fourths of the total surface of the earth lies under water and that it has never been explored by man, it could yield greater mineral riches than we've ever dreamed of."

LUNAR PROBE: Engineers at the recent American Rocket Society meeting in New York examine prototype of a lunar vehicle at Radio Corp. of America booth. Moon probes such as this may also prove useful in studies of ocean floors for mineral deposits.

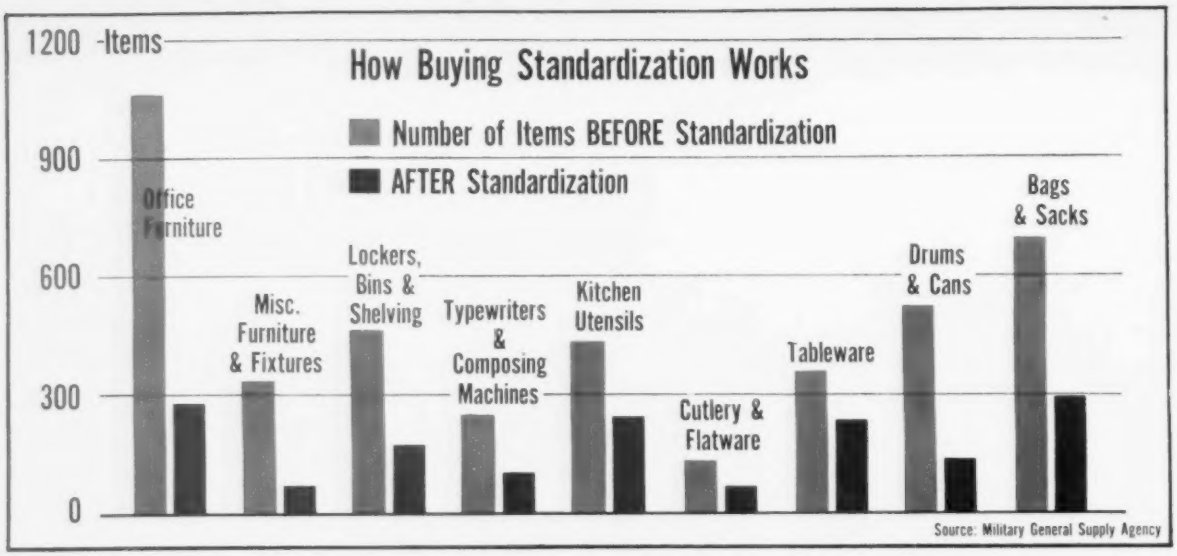
Government Help — Reynolds and Woods Hole won't be probing the ocean alone. A spokesman for the Geological Survey arm of the Dept. of Interior says his group expects to be involved in surveying the ocean floor "in a major way" by July 1962.

The stumbling block right now is that the GS charter does not permit it to investigate areas outside continental United States. But there is legislation pending to correct this. And the Survey has figured on ocean surveys in its next fiscal budget.

Another major problem has been development of equipment to do the actual mining. At the recent rocket show in New York, several space scientists and engineers remarked casually that the current work being done to develop a vehicle to move about and probe on the moon may well be adaptable to undersea locomotion.

Lunar Locomotion—One of the companies working on lunar locomotion is American Machine & Foundry Inc. An informal session with this team, under the direction of Fred K. Powell Jr., a vice president of the company and government products group executive, indicates this is indeed the case.

For one thing, AMF figures for several reasons that the surface of the moon may be very soft and powdery. And these AMF engineers, or "space rats" as they call themselves, figure the fertile areas of the ocean may be soft and oozy. They think a similar method of locomotion may work in both areas.



Military Buyers Outflank Waste

Charges of waste in buying should lose force with the military's new, streamlined method of purchasing.

Under it, the services are weeding out duplication, standardizing items, and simplifying inventory control.

By P. J. Cathey

■ The armed forces have the formula to improve military buying. And they are moving full-force to end costly duplicate buying and purchasing waste.

Actually, a variety of methods are used in the new system, ranging from careful specification to fast, economic shipment of products. But basic aim of the system is always the same: Single source, standardized buying of quality products for use by all the services.

Single Managers—The plan is the single manager system where one supply agency controls buying and distribution of various product categories. Under this system, the Army now handles construction supplies, auto supplies, clothing and textiles, traffic management, subsistence, and general supplies. The Navy does the bulk of the buying for all the services in industrial supplies, petroleum, and medical supplies. (See IA, Oct. 2, p. 129.)

How well the single manager plan works is illustrated by the Military General Supply Agency, (MGSA) Richmond, Va. Set up in January 1960, it manages general or "housekeeping" supplies for all the armed services. Items controlled include hand tools, furniture, office machines warehouse trucks and tractors, rubber, plastic, and glass fabricating materials, and refractories.

Millions Saved—So far, the buying of 15 classes of products has been simplified. Before the MGSA took over, these classes included 4700 items. After study, only about 1800 items were approved for future buying. In some cases, the standardizing reduced the number of items bought from 13 to 1, or from 11 to 1. (See chart.)

MGSA estimates the change will save about $4.5 million a year. When standardization of all general supplies is completed, it's expected 25 pct of the items can be eliminated. This will mean a saving of approximately $37 million a year, MGSA believes.

How to Standardize — Basically, the standardizing works this way: MGSA collects data cards from all the services, and from the General Services Administration, on all items bought.

Each item is coded according to its end use as follows: (A) items of supply subject to continuous redesign and items supplied directly to a weapon or weapon systems: (B) items stocked for mobilization or war readiness and items of supply used exclusively within the Department of Defense, and (C) those which do not fall into the other categories.

"We study each item and look for areas of real commonness," says Maj. Gen. Victor J. MacLaughlin, executive director of MGSA. "We do not have the power to change the coding a service has put on the item, but we can question it. So far, about 22 pct of the codings have been changed. And the classifications of items are kept under continuous study."

What MGSA Does—Under the

system. "A" items are bought by MGSA under the single manager system, but are still managed by the individual services. "B" items are completely supply managed by MGSA. Responsibility for buying, supply, and storage of "C" items is decided by Maj. Gen MacLaughlin, jointly with the General Services Administration.

In addition, MGSA has complete catalog and standardization responsibility for all the 102,000 general supply items. To help in identifying, cataloging, and standardizing items, MGSA set up an exhibit room at Richmond headquarters.

Visual Aid—This exhibit, which is changed periodically, enables personnel to identify products easily and spot duplication. As an example, take the display showing socket-type wrench sets. While each of these sets was stocked by defense agencies under multiple descriptions, their similar nature was not known. Now duplication can be spotted and eliminated.

The coding system and the exhibit room are only two of the advances MGSA uses to streamline buying.

Control and Communication—Supply management is speeded up and simplified through use of electronic data processing equipment. Information on inventories, purchases and shipments is fed over a punch-card transceiver network operated between Richmond and regional stock points. With this system, a supply request can be handled in four hours from receiving a message to dispatch of shipping directions.

From a previous total of about 60 stock and distribution points used by the Army, Navy, Air Force, and Marine Corps, MGSA has substituted three regional stock points and one national control point.

For each stocked item, MGSA maintains a material management study, giving on one sheet a complete analysis or "case history" of the product. It provides data used in buying or disposal, repair and rebuilding, cutback of supply, and distribution or re-distribution.

J&L Using Largest Oxygen Furnaces

■ The world's largest basic oxygen steelmaking furnaces are now in operation at Jones & Laughlin Steel Corp.'s Cleveland Works.

The new furnaces, producing at the fastest rate in history, use a 1500-mile-an-hour jet of pure oxygen to refine iron into steel.

They have already turned out heats of up to 240 tons in less than an hour, compared with open hearths producing at a rate of 40 tons per hour tap-to-tap time.

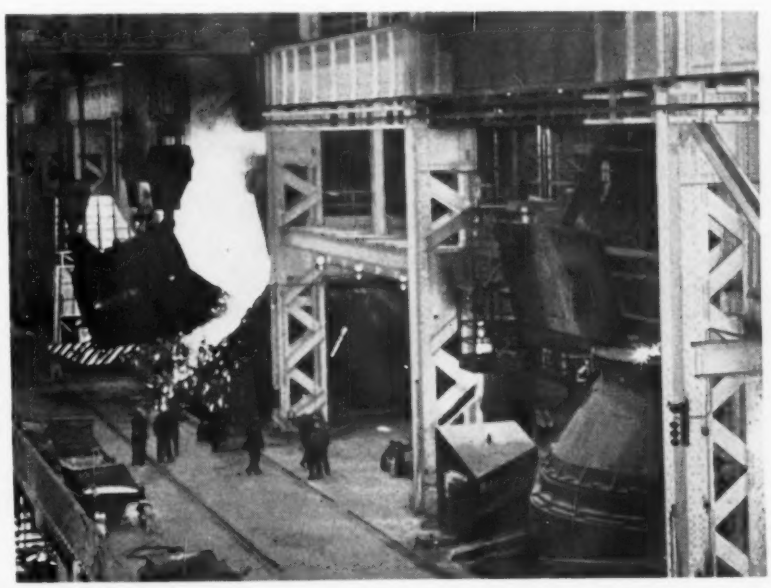
Twice as Large—J&L describes the two furnaces as "the most significant development in the steel industry since the turn of the century." They are more than twice the size of any furnaces of this type in the world.

Vessels of about 50-ton capacity were used in the earlier stages of oxygen steelmaking. J&L introduced larger vessels, in 1957 capable of making up to 100 tons. The latest development has again doubled the size of the vessels.

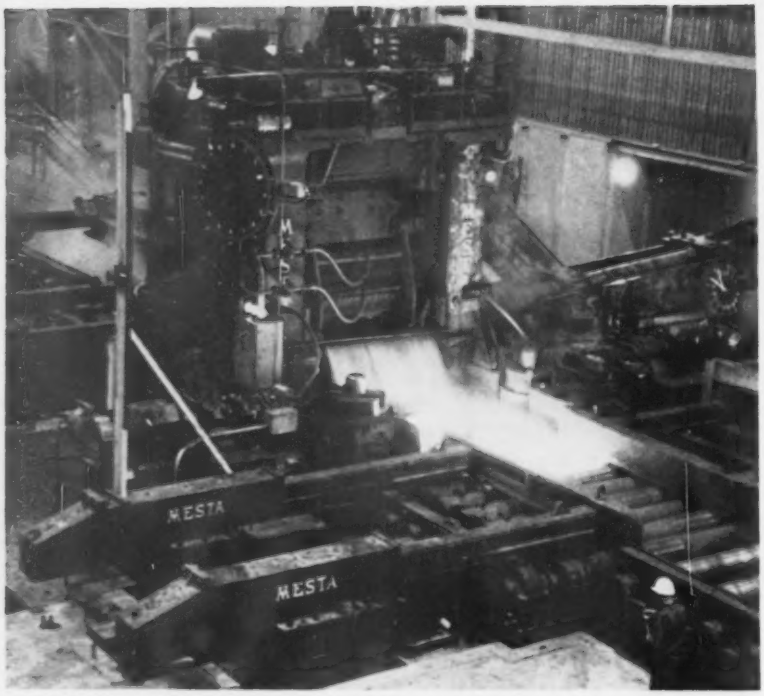
In announcing operation of the new furnaces, J. R. Powell, J&L's Cleveland works manager, stated, "Introduction of the basic oxygen process is significant in Cleveland since some of the early pioneering in openhearth steelmaking took place at this plant almost 100 years ago."

Big Rebuilding Process — J&L has spent more than $300 million to rebuild the Cleveland plant since 1949. Plans for the future, which will be announced soon, will make the plant "the most modern steel producer of its size in the world," Mr. Powell added.

Later last week J&L announced a new hot-strip mill costing about $60 million, will also be installed at the Cleveland Works. The 80-in. mill is described as "the fastest hot-strip mill in the world."



1500 MPH JET: New openhearths now operating at Jones & Laughlin's Cleveland Works use 1500 mile-an-hour oxygen jet to produce steel.



WIDER PLATES, WIDER MARKETS: Wide plates rolled on this Mesta 110-in. reversing mill will enable Alan Wood to expand its plate markets.

Mill Boosts AW's Profit Outlook

■ With a $36 million blooming mill and plate mill expansion behind it, Alan Wood Steel Co. is now looking ahead to the next steps in its long-range program.

The company's next goal is one of two alternatives: To increase its present 800,000-ton steelmaking capacity or to install a new, wide continuous strip mill. Both would be needed to take full advantage of the new blooming mill and plate facilities dedicated last week at Conshohocken, Pa.

Mix Altered—The 40-in. blooming mill and the 110-in. plate mill will alter the product mix of the company. Up to now, the output has been evenly divided between plate, cold-rolled sheet, and hot-rolled sheet. With the new, wider plates on the market, the company's mix will include more than 40 pct plate.

Harlston R. Wood, Alan Wood president, said the decision to replace the old facilities with the $36 million plant was prompted by a growing demand for wider plates than the company could produce.

Profit Position—Mr. Wood estimated that the new plate facilities will enable the company to increase its annual sales to $100 million.

Going a step further, he said that, at 80 pct of capacity, Alan Wood's earnings before taxes and depreciation, but after interest, should amount to $7 million more with the new equipment.

Reserve Fund Tops Chrysler Contract

By signing a new three-year contract with the UAW last week, Chrysler Corp. ended 125 days of bargaining. And it became the only Big Three automaker to avoid a strike this year.

The major difference between Chrysler's new contract and those of GM and Ford, according to UAW president Walter Reuther, will be setting up at Chrysler a special reserve fund to provide adequate SUB payments to laid-off workers and those on short workweeks.

Reportedly, part of the annual 6-cent hourly pay increases of Chrysler's 53,000 hourly workers will go into the fund over a three-year period. The fund will get one cent the first year, two cents in each of the next two years.

Chrysler is said to have agreed to set up a $2 million contingency fund to cushion the new SUB reserve fund, which now totals $3.8 million, only 29 pct of the maximum total. All contract benefits will be retroactive to Sept. 4, same date agreed to by GM and Ford.

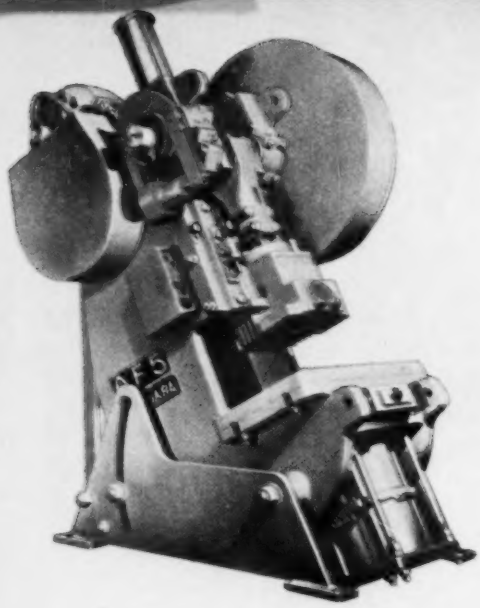
"The company has saved no money over the other companies," said Mr. Reuther. "There was no shortcutting on benefits anywhere."

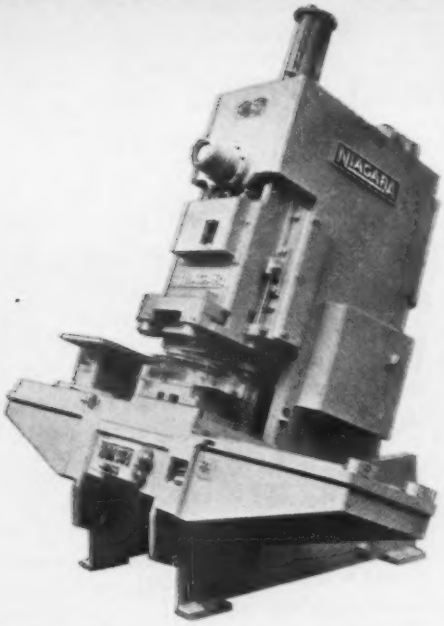
Tools for Soviets Draw New Probe

The controversy over shipments of U. S. products, especially machine tools, to Soviet bloc nations continues to stir up Washington.

More hearings—this time public—are scheduled for December 4. They will be held by Rep. A. Paul Kitchen's special committee probing exports to Russia and its satellites. Previous hearings, with Cabinet officials testifying, were held behind closed doors.

Rep. Kitchen says he may call for stricter laws against exports to Communist countries. Other congressmen are calling for an embargo on exports to the Soviet bloc. They particularly want to stop machine tool shipments.





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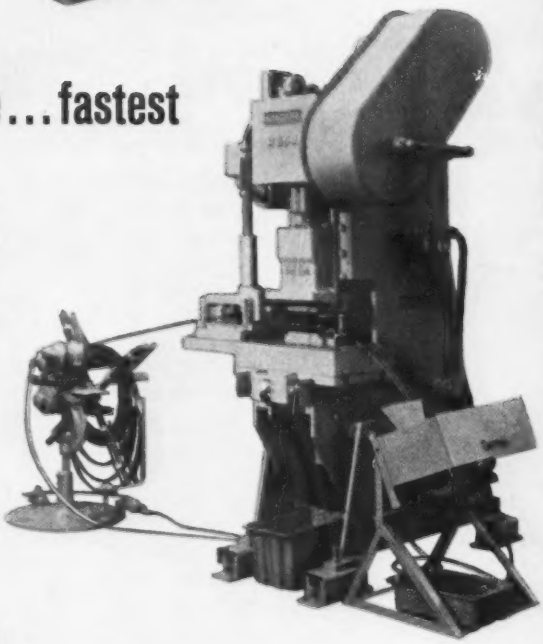

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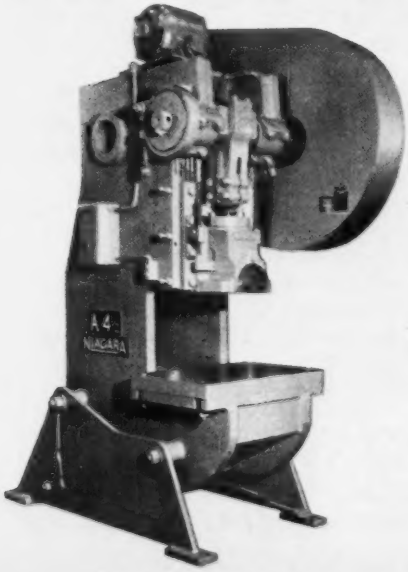

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INDUSTRIAL BRIEFS

New Subsidiary — Ipsen Industries, Rockford, Ill., has formed a new subsidiary, the Refractory Metals Div., at 715 S. Main St., Rockford. Ipsen will step up research in fabricating and processing ultra-high temperature materials.

Diamond Lab—General Electric Co.'s Metallurgical Products Dept. has begun operating a new diamond application development laboratory in Detroit. The facility will be used to study new and improved diamond applications and to evaluate G.E. man-made diamond grinding hardened steels.

Ship Scrapping—Luria Bros. & Co., Inc. has leased drydock and other ship facilities at the Ashtabula, O., yard of American Ship Building Co. Scrapping operations will begin with 7000 tons of midbodies from Great Lakes ore carriers.

New Plant—National Copper & Smelting Co. of Cleveland plans to construct a 100,000 sq ft plant which will triple its productive capacity.

Foundry Expands—The Zollner Corp., Fort Wayne, Ind., is adding 30,000 sq ft to its permanent mold aluminum foundry at a cost of $750,000. Zollner makes cast aluminum pistons and other permanent mold products.

New Lab — Linde Co. Div., Union Carbide Corp., is expanding its laboratories at Tonawanda, N. Y. The new facility will add 10,000 sq ft of space for product development work. Linde earlier started a $2.5 million factory expansion at Tonawanda.

Third Plant—Eriez Manufacturing Co., Erie, Pa., is opening a third plant in the Erie area to house its new Coil Winding Div.

Bliss Buy—Agreement for the acquisition of Portland Copper & Tank Works, Inc., Portland, Me., by E. W. Bliss Co., Canton, O., has been announced jointly by the two companies.

New Line—New Britain Machine Co. will manufacture Morey vertical profiling and milling machines at the Cleveland plant of its Lucas Machine Div.

Name Change — Three western steel fabricating plants and the Winnipeg plant of Canada Iron Co. will operate under the name Western Bridge, Division of Canada Foundries, Ltd. Western Bridge includes: Western Bridge & Steel Fabricators Ltd., Vancouver; C. W. Carry Ltd., Edmonton; and Calgary Structural Steel Ltd., Calgary. Dominion Structural Steel Ltd., Winnipeg, joins the group on November 30.

American Affiliate—Guest, Keen & Nettlefolds Ltd., an English wire firm, has established a U. S. affiliate, Guest, Keen & Nettlefolds (South Wales) Inc., with offices at 122 E. 42nd St., New York City.

Broadens Line—Waukesha Cutting Tools, Inc., Waukesha, Wis. has broadened its product line by purchasing assets of Gairing Tool Co., Warren, Mich.

New Name — New Amsterdam Trading Corp., White Plains, N. Y., has changed its name to Namsco Steel Corp. It is U. S. representative of a number of West German speciality steel mills.

Chattanooga Change—Harriman Manufacturing Co. has acquired Rulco Engineering, Inc., Cleveland, makers of steel rule dies. Operations have been moved to the Harriman plant at Chattanooga, Tenn.

Walker Buys—O. S. Walker Co., Worcester, Mass., has acquired F. W. Shrader Co., Los Angeles, manufacturers of electro and permanent magnetic equipment.

ASA Medal—Louis Polk, board chairman of The Sheffield Corp. and vice president of The Bendix Corp., received the American Standards Association's Howard Coonley Medal at the 12th National Conference on Standards at Houston, Tex.

Man of Year—John Mihalic, vice president of Avco Corp., has been named "Management Man of the Year" by The National Management Assn.

ASM Medal—A. J. Herzig, president, Climax Molybdenum Co. of Michigan, received a top award for the advancement of research at the annual meeting of the American Society for Metals in Detroit.

New President—J. D. Dewhurst, president of Arrow Tool Co., Wethersfield, Conn., has been elected president of the National Tool, Die & Precision Machining Assn.

Named Head—Cecil R. Garland, vice president and secretary-treasurer, W. O. Larson Foundry Co., Grafton, O., has been elected president of the Gray Iron Founders' Society.

New Warehouse — Allied Research Products, Inc., Baltimore, has opened a new warehouse and service laboratory at Bridgeport, Conn. The firm makes chemicals, equipment and supplies for metal finishing.

Lahr Line—Warner & Swasey Co., Cleveland, has acquired Lahr Machine & Tool Corp., Toledo. It will be known as Lahr Machine Div. and will design and make special purpose deep hole and gun drilling machines.

All Equipped—Aluminum Co. of America's foil production mills at New Kensington, Pa.; Alcoa, Tenn.; Edgewater, N. J.; and Davenport, Ia., are now equipped to make ultrasonically welded foil.

Bearing Exclusive—BMB Corp., a subsidiary of General Bearing Co., Inc., will be the exclusive U. S. agent for British Manufactured Bearings Co., Ltd., of England.

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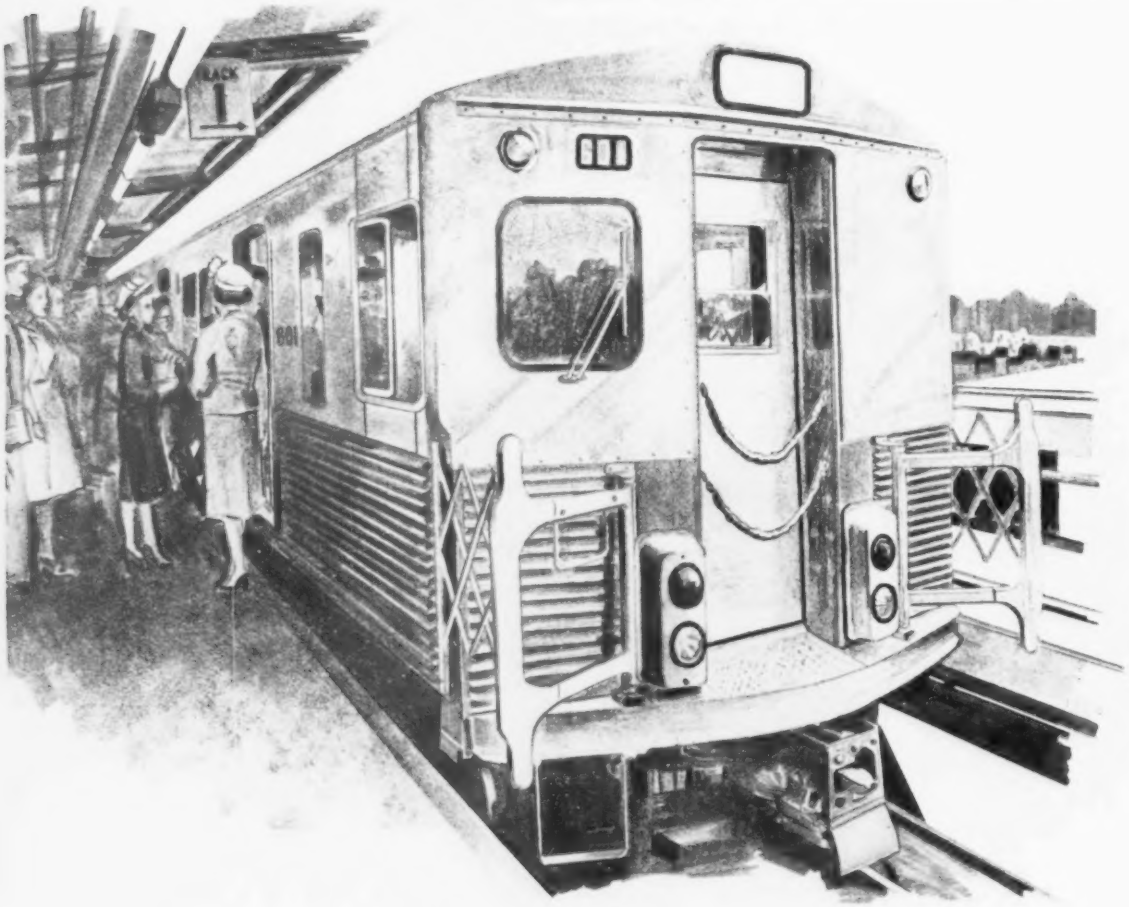

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Plan Plant Location Carefully

With companies expanding and diversifying, more decisions about plant location or re-location must be made.

The top man's role in site selection varies with the size of the company. But, in all cases, his views are vital.

■ Industry is on the move these days, expanding markets, diversifying product lines, setting up overseas divisions. Because of this, decisions on plant location are getting more attention.

Many company executives may be consulted on questions of location or re-location. But often the final decision on when and where to locate rests with the man in the front office. His role varies with the size of the company, but, especially in smaller companies, his word is vital.

With this in mind, how can the chief executive make sure his decision will be the right one? Some guideposts to follow are pointed out in a new survey on site selection for the small manufacturing plant.

How Big a Role?—The study was made by James H. Thompson, professor of economics and director, Bureau of Business Research, West Virginia University. It was prepared by the university for the Small Business Administration.

In small companies, Mr. Thompson notes, the president is usually the key figure in site projects. He generally directs or personally conducts field investigations and makes all decisions. In nine of the twelve "small" companies surveyed, the president handled all phases of the project, as an individual. He made the final decision in all but two of the companies interviewed.

Right to Review—Among "medium-sized" companies, the president made the final decision in most cases, sometimes taking part in field investigations. However, in "large" and "very large" companies, the top man's part in plant location is more restricted.

He did not directly supervise location projects in any of the 18 "very large" and "large" companies studied. In some cases, he either made the final choice of site or helped make it as a member of a top management committee. In others, his part in plant location was limited to reviewing site decisions made by the managers of the divisions involved.

Plan First—One of the most common mistakes in plant site selection comes right at the beginning—failing to give enough attention to preliminary planning.

Mr. Thompson recommends these five planning steps:

Study existing operations to determine problems involved and whether a new plant is the answer. Determine the objectives in establishing a new plant. Prepare list of the requirements as to area, community, and site. Decide upon specific methods of investigating and selecting. Set up the organization needed to do the job.

. . . Keep These Points in Mind

■ Specifically, managers should consider these ways of proceeding:

Get the company's requirements firmly in mind. Decide whether to delegate investigation of cities and sites to other members of the company or to outside consultants. Prepare, or locate, a checklist to use as a guide in collecting data. Develop a list of potential locations.

Screen Candidates—Reduce the number of candidate areas to manageable size by preliminary screening. Investigate the remaining communities systematically, tapping all available sources of information. Doublecheck whenever possible.

Don't overrate initially attractive advantages — subsidies, existing buildings. Remember long-range advantages, such as economically sound locations.

Be Objective—Guard against the effect of your personal likes and dislikes. If conducting the investigation personally, have another qualified person make an independent appraisal before final decision.

What factors make a community attractive to a locating company? Among companies surveyed these were mentioned often: Labor supply, cost, and climate. Transportation facilities, cost, and service. Nearness to markets and supply sources. Community appearance, facilities, and attitudes. Local government and taxation. Availability and cost of utilities.

M&T spray-on vinyl finish goes where the wear is

Two major advantages work for any user of M&T spray-on vinyl finishes. They explain the increasing application of these finishes to automotive interiors such as this station wagon deck as well as appliances, business machines, metal cabinets and instruments.

First is a service benefit. M&T spray-on vinyls are so resistant to abrasion, they outwear ordinary textured enamels by as much as 10 to 1. They also resist stains, scuffing, gouges and cuts. Products that take hard wear look better longer with such a finish.

Second big advantage is in production. These finishes provide a distinctive texture via the *spray gun*. On smooth metal, they can be chemically textured to afford a rich, leatherlike appearance. Sprayed on patterned metal, they "mirror" the pattern with high fidelity even when applied in thicknesses up to 15 mils.

Since the coating is applied to the finished part, it simplifies welding or forming, covers any complex shape, and leaves no raw edges to rust. Rejects are easily stripped and scrap metal is uncoated, for higher scrap value.

M&T has newly enlarged plants to deliver the known quality of vinyl coatings in quantity, in colors specified, on schedule. Plastisol coatings are also produced for heavy duty, industrial protective coating applications. Send for details on M&T Spray-On Vinyls, or for an M&T coating specialist to study your requirements and advise you.

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Plastics Bombard Cost Line

The mass output of fiberglass reinforced plastic car bodies is given a boost by new report.

Study contends up to 100,000 FRP bodies can be turned out without any money hazard.
By A. E. Fleming

■ There's little doubt that fiberglass reinforced plastic (FRP) can make a good car body. Chevrolet has proven this with the Corvette.

But how about cost? Is mass production economically possible? How many fiberglass bodies can be built before higher material and fabricating expenses, compared to steel, overcome tooling savings?

The breaking point has been thought to be 25,000 units at the most. Corvette has never reached that, the top being 10,939 in the 1961 model year.

New Study—Now comes a study by Owens-Corning Fiberglas Corp., claiming it's possible to turn out up to 100,000 FRP bodies a year before running into money hazards.

The report is eye-catching because it implies that mass output of plastic car bodies is economically workable. (See table, below.)

Leading to the new thinking, according to O-C is the declining cost of FRP compared to steel alloys, and improving processing techniques.

Cost Saving—An important cost saving device involves "corollary weight savings," meaning the lower weight of the FRP body compared to steel could make possible weight and price savings in parts such as the engine, chassis, driveline, transmission, brakes, suspension and tires.

Critics of plastic bodies point out they pose problems. Auto companies which have made experimental plastic hoods, trunk lids and fenders, in some cases have come away with the feeling that it's an expensive operation involving much hand labor as well as joining and fastening headaches.

FRP Cheaper—Nevertheless, the report indicates 100,000 four door sedans designed to take advantage of molded FRP body construction could be made cheaper than with steel body construction. The study uses as an example a medium priced sedan with a 120 in. wheelbase, 212 in. long, 78 in. wide, 56 in. high, weighing 4200 lbs.

Net Cost—O-C says that in a three-year tooling cycle, net cost of the FRP body would be $558 if 20,000 were made compared to $625 for a steel body; $496 for 40,000 units compared to $520 for steel; and $458 for 100,000 compared to $438 for steel.

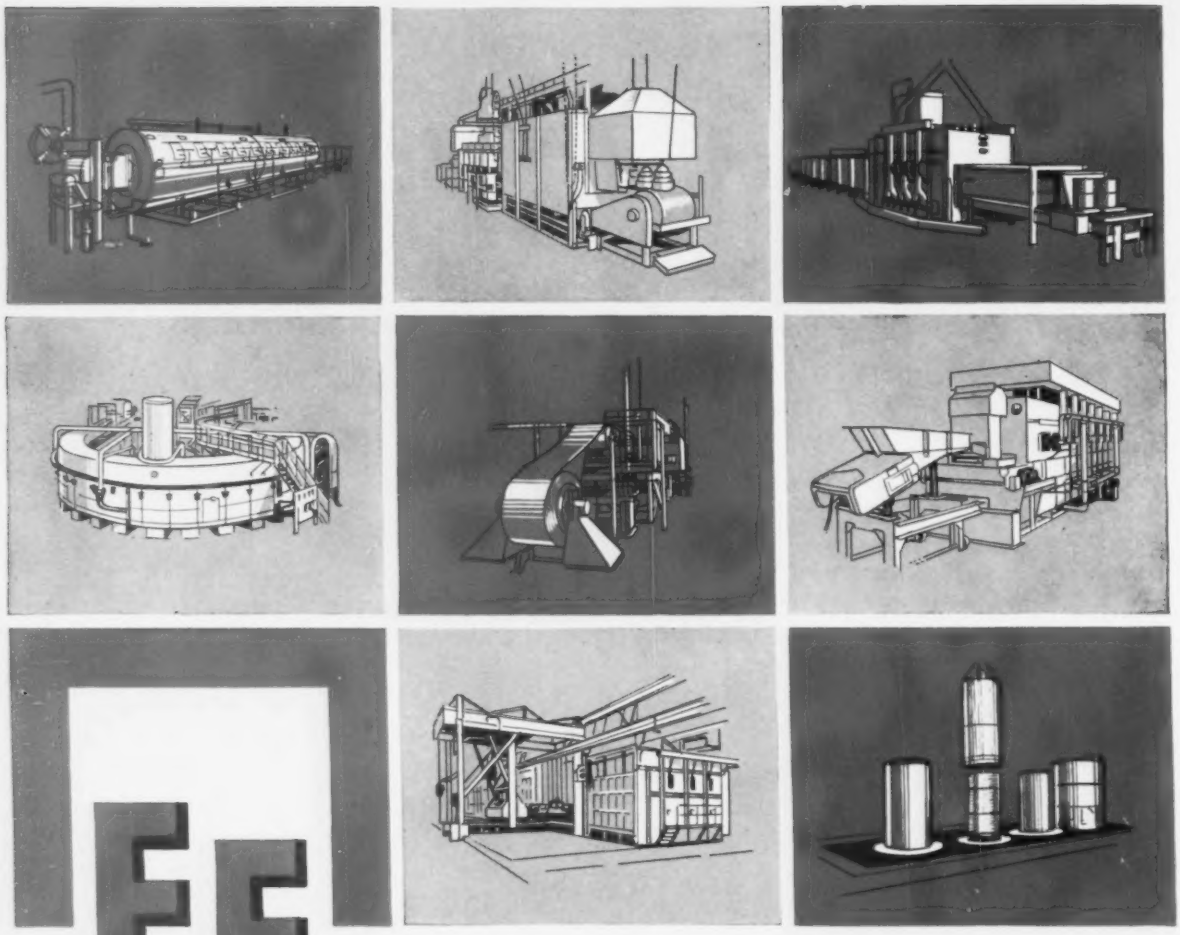
Tooling Costs: Steel vs. Fiberglass

Steel Body

Units Per Year	20,000	40,000	100,000
1st Year	$8,000,000	$9,000,000	$10,000,000
2nd Year	$2,000,000	$2,500,000	$3,500,000
3rd Year	$2,000,000	$2,500,000	$3,500,000
Total Tooling	$12,300,000	$14,400,000	$17,500,000
Tooling Cost Per Car	$205	$120	$58

Fiberglass Reinforced Plastic Body

Units Per Year	20,000	40,000	100,000
1st Year	$585,000	$800,000	$1,800,000
2nd Year	$150,000	$200,000	$450,000
3rd Year	$150,000	$200,000	$450,000
Total Tooling	$1,084,000	$1,474,000	$3,199,000
Tooling Cost Per Car	$18	$12	$11



EF

builds ***all types and sizes*** *of*

INDUSTRIAL HEAT TREATING FURNACES

including the one that's best for you!

Designed and built to meet your **specific** and **individual** requirements, EF heat treating furnaces assure users high heating efficiency; accurate, automatically controlled cycles; high hourly outputs; and extremely uniform product physicals that assure high market acceptance and reduce the cost of subsequent forming, fabricating and finishing operations.

Furnished complete with special atmosphere equipment and all materials handling facilities if desired. 40 years experience. Thousands of successful installations. No job is too large or too unusual. For utmost satisfaction — and economy — submit your furnace problems to the experienced EF heat treating engineers — ***You'll find it pays!***

THE ELECTRIC FURNACE CO.

Gas-fired, Oil-fired and Electric Furnaces for Heat Treating any Product, Using any Process, any Hourly Output.

Salem - Ohio

SUBSIDIARIES: Turnkey Engineering Co., Inc., South Gate, Cal. • Canefco Ltd., Scarborough, Ontario
Electric Furnace (Europa) N.V., Van Helmontstraat 22, Rotterdam (7) Holland

LICENSEE: Daido Steel Co. Ltd., Nagoya, Japan

West Coast Naval Yards Hum

But Congressional Action May Change Their Tune

Most repair work is now done at Naval yards, but SB 721 could change that.

Shipbuilders around the country favor the bill, but Navy 'brass' is expected to fight it.
By R. R. Kay

■ What's the status of West Coast shipbuilding?

Better than in some years. But not nearly good enough to make up for the many post-war years of famine.

Things are humming at the six Farwestern naval shipyards: southern California's Long Beach and San Diego; northern California's San Francisco and Mare Island; Washington's Puget Sound; and Hawaii's Pearl Harbor.

The Fight Is On—Private shipbuilding and repair yards, though, are fighting hard for more business. They're having a tough time keeping their yards busy.

Private yards are doing well on new construction. But they feel they should have more of the repair work that's now going to the Naval shipyards.

During fiscal 1961, they point out, Naval yards at San Diego did $68 million in repair work. Private yards got only $13 million.

The fight in Congress—Senate Bill 721—calls for the Navy to spend in private yards 75 pct of its annual budget for conversion, alteration, and repair. That's about the same percentage private yards now get on new construction.

Nationwide Backing — The bill has the backing of shipbuilder groups on the Atlantic, Gulf, and Pacific Coasts. In the Farwest, alone, it would help some 30 private firms directly . . . and indirectly, the whole complex of suppliers and labor groups who serve the industry.

Now that Congress isn't in session, SB 721 is dormant. But you can count on vigorous action from the private shipbuilders.

Private yards ought to get twice as much business as government yards—which, in turn, ought to cut their activity in half. That's the stand of Edwin M. Hood. He's president of the Shipbuilders' Council of America.

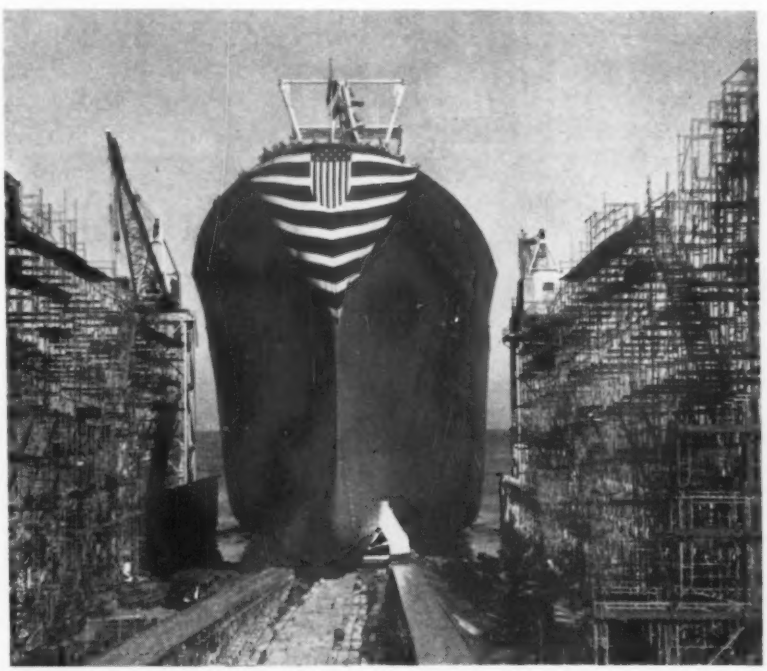
Question of Interest—Mr. Hood believes that the government's policy of giving 80 pct of the repair and alteration work to its own yards is "opposed to the national interest."

Navy won't take it quietly. Top 'brass' feels it's not entirely in the best interests of defense to turn over so much repair work to private firms.

Along The Coast—Here's what's going on in the private yards on the West Coast:

Bethlehem Steel's San Pedro (Los Angeles) yard is coming alive. It's reactivating three attack destroyers. Todd Shipyards' Los Angeles unit has 3500 workers busy on a Navy guided missile destroyer and five commercial vessels.

At San Francisco, Bethlehem has a fairly stable backlog.



ON THE WAY: SS Philippine Bear was recently launched at the San Francisco yard of Bethlehem Steel Company's Shipbuilding Div. Built for the Pacific Far East Line, Inc., it has a raked stem and a cruiser stern.

Western BRASS

(Before)

Olin BRASS

(After)

The letterheads have been printed, signs made... and here we are wearing a new name. But in the mills things go on pretty much as they always have. We've put in some new machines and broadened our line... but essentially it's the people at Western (oops!) *Olin* Brass that really make the product. They *care*. That's the "Tailor-Made" approach.

If you're an old customer you know what we mean. If you're not – ask one of our users. Chances are he'll tell you the uniform quality and individual engineering of his metal has managed to save him money in inspection, fewer rejects and less lost time.

Olin Brass can do the same thing for you.

We're the same folks.

(Brass sales headquarters at East Alton, Illinois)

METALS DIVISION Olin
400 Park Ave., New York 22, New York.

Can Metal Removal Costs Be Cut?

Norton's Merritt: "Abrasive Machining Is a Way"

Research Engineer Tells ASTME 30 pct of American machining is obsolete.

Need for open minds and new techniques is cited.
By R. H. Eshelman

■ "At least 30 pct of machining operations in American industry today are done by obsolete methods," declares Richard H. Merritt, research engineer for Norton Company.

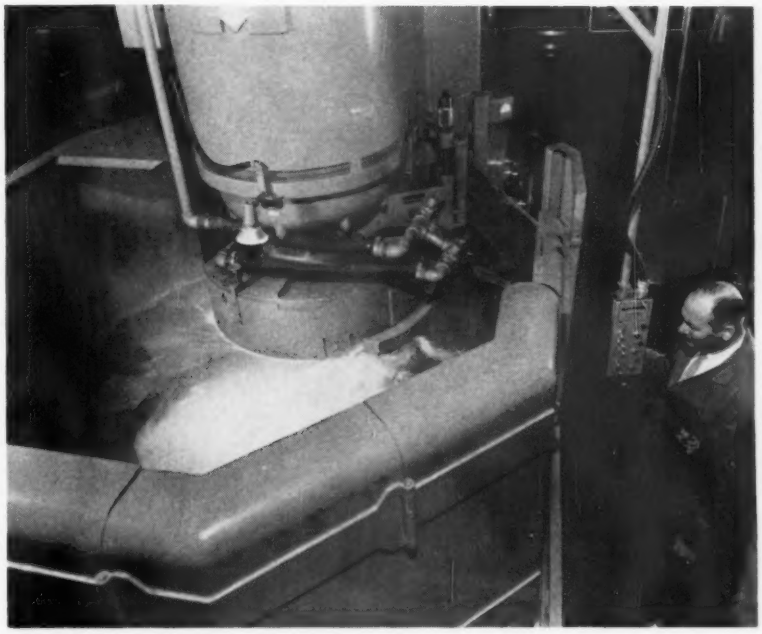
Merritt made this statement recently in addressing a regional conference of the American Society of Tool and Manufacturing Engineers at Augustana College, Rock Island, Ill.

"Abrasive machining is a way for manufacturers to save a large part of the $14 billion now spent each year just to remove unwanted metal," Merritt claims, adding:

Boston to L. A.—"These 18 million tons of scrap metal, costing $14 billion to remove, would fill a continuous line of trailer trucks, bumper to bumper, from Boston to Los Angeles. Cost of the material removed and of removing it by cutting tools are burdens on the industry. Contrary to popular belief, metal chips have no value to the producer."

He outlined several ways abrasive machining can reduce the cost of producing metal parts. Smaller amounts of excess metal are left on castings and forgings for proper machining. Work can be set up on abrasive working machine tools quickly and without expensive work-holding fixtures.

Merritt, a registered professional engineer from Worcester, Mass., has played a leading role in an abrasive machining project currently in progress at Norton Company. This project is being conducted to determine conditions under which metal removal by abrasives is more economical than conventional machining.



NEW WAY: Abrasive machining demonstration on Mattison #60 vertical spindle grinder shows new technique of fast metal removal with tilting head. Workpiece is hardened steel die block.

Open Minds — "The real challenge to the metalworking industry is the need for open minds willing to consider new techniques," continued Merritt. He cited one outstanding case of savings when a manufacturing job was completely engineered for abrasive machining.

Once, taps were cut. Today they are abrasive machined. The square shank of a tap is now formed in six seconds by grinding compared with 24 seconds in the past. One abrasive wheel will do 60,000 taps from a piece of hardened steel. Problems of distortion due to heat treating after machining are eliminated.

Merritt pointed out that recent improvements in grinding wheels and the machine tools on which they are used are making these savings possible. Tools are now being made specifically for abrasive machining. However, American industry can begin realizing the benefits right now on existing equipment, he says.

Big Investment—Merritt revealed that three leading U. S. abrasive makers have invested more than $75 million in expanded production and research facilities in five years.

HYSTER

COFFEE BREAK

It's an American institution, argued pro and con by businessmen, educators, labor unions and secretarial pools. Few argue with the coffee—it's the length of the break that affects productivity and profits.

For companies using industrial trucks, Hyster has a possible answer: make 'em want to stay on the truck!

Industrial designer Henry Dreyfuss and his staff spent hundreds of hours designing a lift-truck seat, for example, that is just right for the operator. Not too hard, not too soft. Leg-room is another key to comfort. Whether the operator is five-foot-four or six-foot-four, he finds the controls perfectly located for easy, safe operation.

Take a look at pedals, steering wheel, load control levers. These trucks have been built by people who know the problems of the men who use them. We call it "human engineering." You'll call it profits. This is the line that sets the engineering pace for all lift trucks.

INDUSTRIAL TRUCK DIVISION—Lift trucks and attachments, mobile cranes, straddle carriers
TRACTOR EQUIPMENT DIVISION—Construction and logging equipment; Heavy-duty trailers
INTERNATIONAL DIVISION—Overseas truck and tractor manufacturing, sales and service

Manufactured in: Portland, Oregon (Home Office) • Danville, Ill. • Peoria, Ill. • Kewanee, Ill. Australia • Brazil • England • France • The Netherlands • Scotland • Republic of South Africa

CUSTOM LEASING PLAN

HYSTER COMPANY
INDUSTRIAL TRUCK DIVISION
P. O. Box 847 • Danville, Illinois

MEN IN METALWORKING

A. F. Franz, named chairman of the board, Colorado Fuel & Iron Corp.

L. C. Rose, elected president and director, Colorado Fuel & Iron Corp.

R. C. Stillman, appointed vice president, Torrington Manufacturing Co.

United States Steel Corp—W. O. Lawrence, appointed vice president, manufacturing, Universal Atlas Cement Div.; M. F. Hazel, appointed president, Oil Well Supply Div.; J. A. Neyenhouse, Jr., appointed general manager, strapping, U.S. Steel Supply Div.

Swedlow Inc.—W. E. Poitras, elected vice president and director, marketing, and a member of the board of directors.

United Electric Controls Co.—S. T. Herr, appointed executive vice president and general manager.

White Sewing Machine Corp.—H. H. Maltbie, named vice president and general manager, Specialty Valve, Trap & Controls Div.

Whirlpool Corp.—C. J. Trone, Jr., appointed operations controller.

Ladendorf Co.—J. D. Stank, elected vice president.

Sharon Steel Corp.—E. A. Wyled, named district sales manager, Philadelphia; R. W. Keenan, named asst. to the vice president, sales.

Florida Drum Co., Inc.—W. J. Neville, named vice president in charge of sales.

Republic Steel Corp.—J. P. Pillar, named storekeeper, Warren district.

Soule' Steel Co.—K. W. Archer, named general manager, Architectural Products Div.

Textron Electronics, Inc.—J. R. Baker, named general manager, Manufacturing Div., MB Electronics.

Torrington Manufacturing Co.—R. J. Kenny, appointed chief design engineer, Air Impeller Div.

Whirl-Air-Flow Co. — D. B. Bartz, appointed chief engineer.

Thompson Ramo Wooldridge Inc.—W. H. Goldbach, named manager, new ordance works, Tapco plant.

D. P. Sommer, elected president, Keystone Steel & Wire Co.

R. G. Hill, named vice president, sales, Leece-Neville Co.

Chrysler Corp.—D. E. Brichta, appointed manager, purchasing, Power Train Group.

Caine Steel Co.—M. M. Geraty, named sales representative, Chicago Div.

Jones & Laughlin Steel Corp.—W. W. Jones, appointed asst. district sales manager, Cleveland sales office.

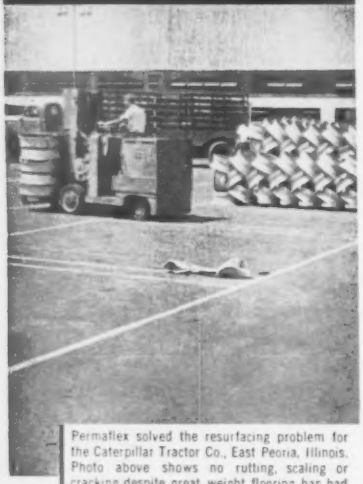
Kaiser Steel Corp.—A. L. Collin, appointed asst. manager, engineering sales.

Metal & Thermit Corp.—W. C. Perdue, appointed technical service engineer, Murex Welding Products Div.

New Britain Machine Co.—J. M. Beyvl and M. C. Hartmann, appointed sales engineers, New Britain-Gridley Machine Div.

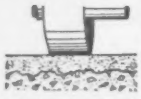
(Continued on P. 102)

RESURFACED FLOORS
IN
PERFECT CONDITION
AFTER 8 YEARS!



Permaflex solved the resurfacing problem for the Caterpillar Tractor Co., East Peoria, Illinois. Photo above shows no rutting, scaling or cracking despite great weight flooring has had to withstand over the years.

Will not RUT under 3000 PSI



Attesting to the indestructibility of hard mastic PERMAFLEX are thousands of industrial plants, freight yards, truck terminals, railroad stations, warehouses, and shipping piers all over the U.S. Since 1918, over 100,000,000 sq. ft. of floor has been resurfaced with Permaflex. Permaflex is the original mastic . . . the only mastic capable of heavy duty! It bonds perfectly . . . never comes loose! Practically maintenance free! Permaflex is installed over old or new concrete, wood, brick or stone floors, walks or drives. Interior or exterior. A demonstration will convince you not to accept any substitute mastic (see test offer below). For if it isn't Permaflex . . . it isn't permanent!

NO DOWNTIME!

No need to move machines and stop production when you resurface with Permaflex. Floors are finished to a feather edge right up to equipment. Eliminates chipping problem! Smooth Permaflex floors are ready for foot traffic in 6 to 8 hours, heavy trucking in 24 hours, depending on drying conditions. Cost is amazingly low.

FREE LITERATURE FREE TEST OFFER

Write for 100 sq. ft. trial offer. Also free literature.

PERMAFLEX PRODUCTS COMPANY
1846 NORTH FRONT STREET, PHILA. 22, PA.
Specialists in industry flooring for over 35 years

(Continued from P. 101)

Frederic B. Stevens, Inc.—F. C. Querry, Jr., appointed product engineer, Clark-Cooper Div.

Fansteel Metallurgical Corp.—Robert Bracher, appointed sales engineer covering Mid-Atlantic States, Contacts and Specialties Div.

Hancock Telecontrol Corp.—W. E. Munns, named sales representative.

Hagan Chemicals & Controls, Inc.—J. M. Harvey, named manager, Cleveland district office.

Kelite Corp.—C. J. Martin, appointed eastern regional sales manager.

De Laval Steam Turbine Co.—V. E. Bochnak, appointed manager, Steam Turbine Sales.

Revere Copper and Brass Inc.—P. L. Waterman, appointed special executive representative, Detroit headquarters; N. F. Kelley, appointed sales manager, New Bedford (Mass.) Div.; R. A. Smith, appointed manager, merchandise sales, New Bedford (Mass.) Div.; W. S. Young, appointed district manager, Grand Rapids (Mich.) sales office.

Black-Clawson Co.—E. J. Kuhn, appointed sales engineer, Air Systems Div.

Collier Carbon and Chemical Corp. — H. H. Brandt, appointed manager, Industrial Carbon Sales.

E. I. Hemming, appointed general manager, Sulphur Springs, Tex. plant, Rockwell Manufacturing Co.

A. F. Flood, elected vice president, administration, Kollsman Instrument Corp.

American Metal Climax, Inc.—Frank Wills, appointed technical manager, Pyron Co. Div.

Waterbury Rolling Mills, Inc.—N. C. Corcoran, Jr., appointed general sales manager; G. P. Kirwan, appointed general works manager.

Aluminum Co. of America—J. A. McGowan, appointed general manager, field sales.

Armco Steel Corp.—W. R. Wiedman, appointed standard pipe representative, Denver, Colo., National Supply Div.

Bethlehem Steel Co.—V. J. Pazzetti III, appointed manager, sales, Atlanta, Ga., sales district.

Snyder Corp.—J. C. Shovlin, appointed sales engineer.

P. E. Dutcher, appointed director, marketing, Industrial Products Div., Westinghouse Air Brake Co.

Clark Equipment Co.—R. W. Robinson, named general sales manager Automotive Div.

U. N. Alloy Steel Corp.—R. W. Miller, appointed Midwestern representative.

Hughes Aircraft Co.—T. H. Anderson, appointed marketing manager, Microwave Tube Div.

Hamilton-Electrona, Inc.—W. H. Street, Jr., appointed district sales manager.

Electric Storage Battery Co.—C. A. Taylor, named manager, southeast region, Exide Industrial Marketing Div.

Empire-Reeves Steel Corp.—Andrew Patton, appointed asst. general superintendent, Mansfield Plant; L. F. McCaffrey, named general superintendent, Mansfield; A. L. Allen, named asst. works manager, Mansfield.

Litton Industries, Inc. — Frank Moothart, appointed group controller, Litton Systems, Inc.; R. A. Hagberg, appointed vice president and general manager, Triad Transformer Corp.

Mallory Metallurgical Co.—Max Hutton, named staff engineer.

Bowman Steel Corp. — G. K. Bradford, Jr., appointed district sales manager, eastern Ohio, western Pennsylvania, western New York, and the state of West Virginia.

Koppers Co., Inc.—A. B. Fisher, Jr., appointed chief engineer, Engineering and Construction Div.

Ohio Crankshaft Co. — G. D. Pfaffmann, appointed manager, Michigan District, TOCCO Div.

United Aircraft Corp. — R. T. Baseler, named asst. engineering manager, Pratt & Whitney Aircraft Div.

Newton Hydraulic Tooling Co., Inc.—A. S. Rairden, appointed general manager.

P. F. McDonald & Co., Inc.—W. H. Dooland, appointed sales manager.

Kline Manufacturing Co.—L. J. Stoutenburg, named sales manager.

Now Danly engineering pierces more fender skirts with one!

It took three separate presses to pierce 62 mounting holes and shear pairs of inner fender skirts for a major automobile maker. Then Danly engineers were invited to cut costs. And they did! They designed this up-acting mechanical press with built-in hydraulic piercing units to do the job better and faster. It's engineered to turn out 600 fender skirts per hour—considerably more than the three presses it replaced! Much more economically, too, because it also eliminates two sets of complex cam type piercing units and the automation between the presses. Greatly reduces labor costs and floor space requirements, too.

The solution to this problem of how to accomplish these many operations on an irregularly-shaped piece of metal required broad experience in mechanical press, hydraulic press and hydraulic piercing equipment design—plus a good deal of imagination. This made the job a "natural" for Danly because, in each of these areas, Danly engineers are known to excel. Perhaps you, too, have a press problem that's a natural for Danly engineers. Shall we discuss it?

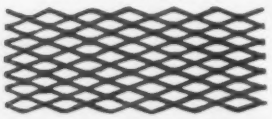
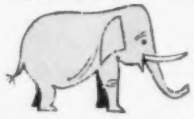
DANLY®

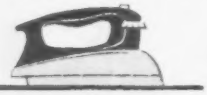
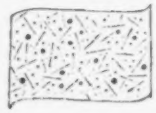
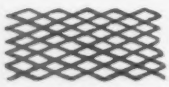
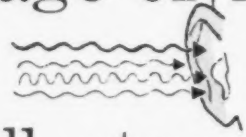
NEW ENGINEERING BULLETIN
—tells just what this mechanical-hydraulic press does—and how it does it. Write for your copy.

Mechanical Presses, Die Sets, Diemakers' Supplies, Hydraulic Metalworking Equipment

DANLY

DANLY MACHINE SPECIALTIES, INC., 2100 South Laramie Avenue, Chicago 50, Illinois

With Wheeling Expanded Metal  , you can reduce product weight .....without sacrificing product strength  .

Improve product appearance as well – because Wheeling Expanded Metal comes in flattened  or textured  styles... with large openings or small  . And this practical, decorative metal permits free passage of light , air , sound  and heat . Get the full story..... from your Wheeling man . Or write to Wheeling Corrugating Company , Wheeling, W. Va.

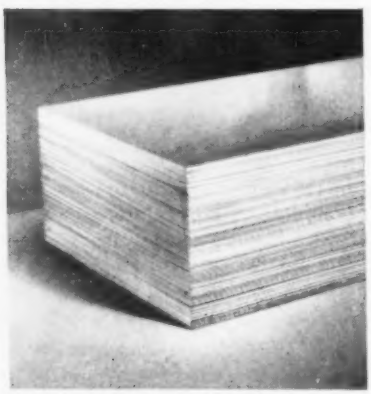
WHEELING CORRUGATING COMPANY • IT'S WHEELING STEEL!

Warehouses: *Boston, Buffalo, Chicago, Columbus, Detroit, Kansas City, Louisville, Martins Ferry, Minneapolis, New York, Philadelphia, Richmond, St. Louis.* Sales Offices: *Atlanta, Houston, New Orleans.*

OTHER WHEELING PRODUCTS

Wheeling SofTite® Cop-R-Loy® Galvanized Sheets offer outstanding corrosion protection . . . can be painted . . . and formed into any shape specified.

Wheeling Hot and Cold Rolled Sheets are widely known for their smooth, uniform finish. Hot and Cold Rolled Strip also available.



Wheeling Long Terne is available in widths to 48". It is normally supplied with either commercial or special terne coatings.

Multiply By 8?

■ The union contract in a wire and cable manufacturing plant guaranteed that employees called to work on a holiday would get at least four hours' pay. This provision had been in effect for many years and had not created any difficulties until one Veterans' Day.

The trouble was that a few months earlier, management had established a new shift, from 4 pm to 12:30 am. The men on this shift, therefore, worked a half hour into the holiday and expected an additional 3½ hours' pay.

Not Applicable—"The holiday guarantee doesn't apply to this kind of a situation," said the plant manager. "The men were called in the day before the holiday, not on the holiday itself. We're not going to give four hours of pay for a half hour's work."

The union insisted that the contract had to be interpreted exactly as written. "It doesn't matter when the men were called to work. They were obliged to work on a holiday and that calls for a four-hour guarantee," said the international representative.

Eventually the case went to arbitration under the rules of the American Arbitration Assn. How would you rule?

The Arbitrator Ruled:

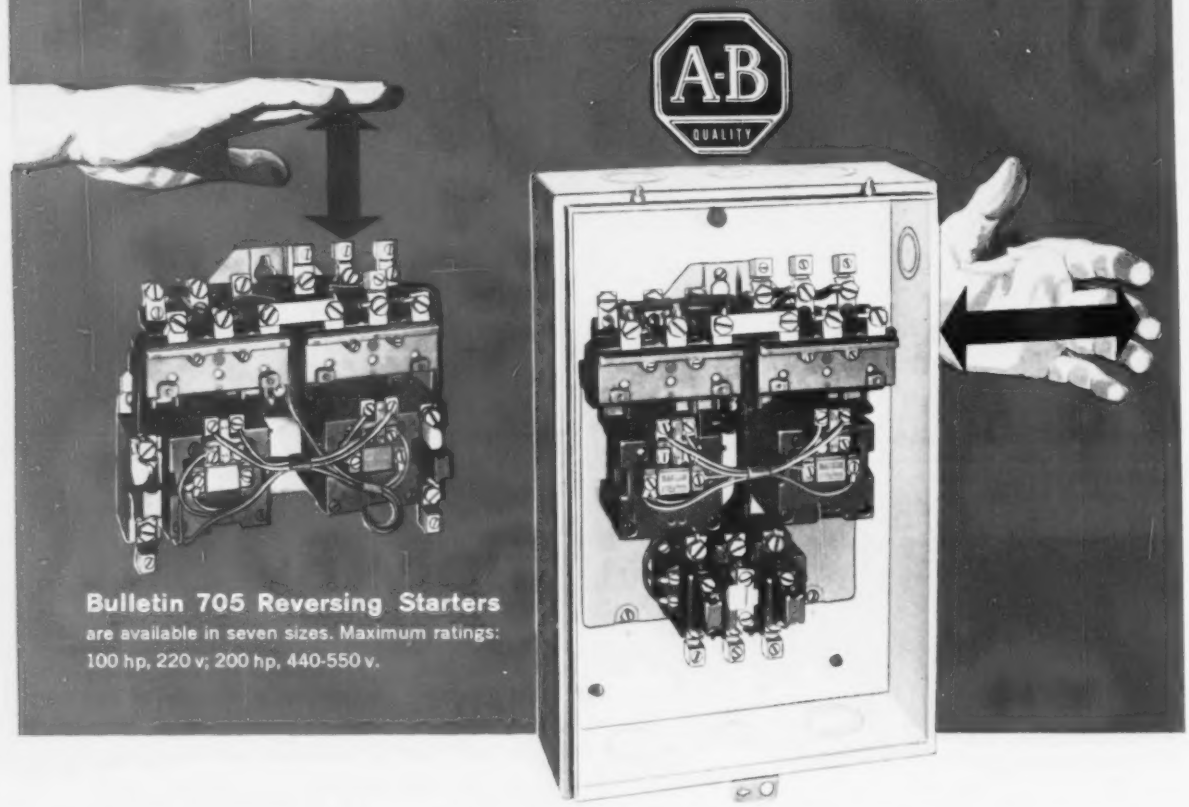
He upheld the company's viewpoint saying: "The purpose of the four-hour holiday minimum appears to have been to prevent employees from being required to work on a holiday except in case of real necessity. Thus, unless there's a compelling reason, the company can not make it impossible for them to spend the festive day with their families. The requirement to work a half hour beyond midnight on the holiday certainly does not result in any significant interference with plans for the holiday."

From the files of
The American Arbitration Association

"You Arbitrate It!" appears in the second issue of The IRON AGE each month. Look for it in the December 14, issue.

CAUTION: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.

No Matter Where You Install Them—



Bulletin 705 Reversing Starters
are available in seven sizes. Maximum ratings:
100 hp, 220 v; 200 hp, 440-550 v.

The New Allen-Bradley Reversing Starters are "Ideal" for the Application

Whether you're using the "open type" Bulletin 705 reversing starters in special panel mounting or as an enclosed device for mounting on a machine, the space you can save will surprise you—especially in the higher ratings! For instance, the open type construction is appreciably narrower than the older design. In the enclosed design—because the overload relays (either 2 or 3) are mounted as a "block" below the reversing switch, the cabinet is much narrower.

There is no denying that the new A-B Bulletin 705 reversing starter is the best "buy" on the market today. Rating for rating, the old reliable Bulletin 705 reversing switches can no longer be compared with their successors. While the simple one-moving-part solenoid principle of operation has been retained, the detail design and construction has been greatly improved. The result is *extra* life that assures almost unbelievable reliability.

The new, attractive enclosures add extra "eye appeal" to any installation. For full details, please write today for Publication 6100: Allen-Bradley Co., 1341 South First Street, Milwaukee 4, Wisconsin.

ALLEN-BRADLEY
Member of NEMA

QUALITY MOTOR CONTROL

Burns Oxygen From Gyro

Researchers at AC Spark Plug claim they have stopped the effects of oxidation in gyroscopic instruments. The gyro is considered the heart of an internal guidance system for ballistic missiles. Dubbed Lo-ox, the process controls the amount of oxygen present in the bearing housing which could attack the lubricant. The oxygen is burnt from the system. This method even removes the oxygen molecules absorbed by the materials.

Vary Space Structures

Designers are working out ideas on variable-shape space structures. These could be fired into space in compact packages. Once in orbit, the compacts would unfold to a wide range of geometric shapes, as satellites, antennas and re-entry vehicles. Rigid rings and triangular arches provide many configurations from conical, spherical to octangular.

Solid Fuel Fires at −50°F

Firing of a frost-covered rocket, the largest solid-fuel motor ever tested at sub-zero temperatures, has been reported by Grand Central Rocket Co., Div. Lockheed Aircraft Corp. The solid rocket was fired at −50°F. This demonstrated that the company's new Polycarbutene-R propellant will operate under severe environmental conditions found by large military rockets.

Compacts Tungsten Inserts

Tungsten rocket nozzles, with up to an 85 pct theoretical density, are being produced for the AEC. The high-purity tungsten inserts show small grain size, fair machinability and good dimensional stability. The inserts are sintered at 4670°F in an induction furnace using helium.

Reports Only Useful Data

Data Compaction, a new method of transmitting the results of space experiments is being developed by scientists at IBM. In transmissions using the new compaction method, redundant information is removed inside the satellite. Much of the information gathered in space is constant. Scientists are usually interested only in variations from the standards. Once coded, the transmitter will stay off the air until it has something useful to report. This will also conserve power.

Lamp Duplicates Sunlight

A new short-arc lamp, developed by Westinghouse, provides up to 1300 candlepower per sq/mm. It's part of a lighting system that duplicates the intensity of the sun. The system will be used for environmental testing of space-bound structures at the California Institute of Technology. The light's intensity can be varied from that which might be encountered during a probe around Venus to a brillance found around Mars.

Building-Block Satellites

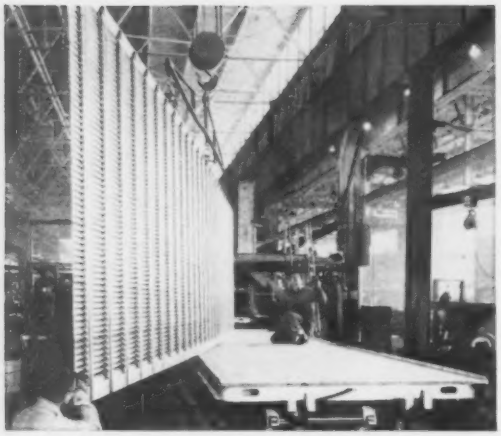
Until now, satellites have been custom designed for various scientific projects. NASA is developing a new concept of standardization to put each space shot to fuller use. Administrator James E. Webb says, "The new satellites will be constructed with up to 50 modular compartments. Each will be a simple plugged-in electronic building block. Setups for experiments can be built independently to fit one or more modules."

Lighter Magnesium Alloy

Magnesium takes another step in its bid for more light-metal applications. New lithium-magnesium alloys are about 20-pct lighter than magnesium. Even more important, crystal structure is altered to make the material more ductile. The alloys show an excellent resistance to penetration by high-velocity particles. Thus, space platforms and satellites may find another protector from bombardment by micro-meteorites.

Shortcut to the Moon

A two-year shortcut to our manned moon landings is undergoing serious study. Instead of waiting for the giant Nova booster, our space scientists would send up a three-man capsule with a smaller Saturn-type rocket. A second rocket would rendezvous and hook onto the capsule in orbit. Our astronauts would then have the power to proceed to the moon and back. Nuclear-rocket propulsion could be utilized for the flight.



Dollar savings provided by building Volume☆ Vans with (USS) Cor-Ten High Strength Steel

Fruehauf Trailer Company works some design magic with USS COR-TEN Brand Steel that results in substantial construction savings.

In their stressed-skin trailers, called "Hi-Tensile Volume☆ Vans," USS COR-TEN High-Strength Low-Alloy Steel is used for the side and roof panels, angles and rub rails. Welding this steel instead of riveting contributes to lower cost, also makes the Hi-Ten Volume☆ Van strong and sturdy.

Increased strength and rigidity also are obtained by cold forming COR-TEN Steel side and roof panels with ¼" deep rectangular corrugations. Angles and rub rails are of USS COR-TEN High Strength Steel and together with the side and roof panels, add up to a total of only 2,500 pounds in each trailer. COR-TEN Steel also has improved atmospheric corrosion resistance and, as an added bonus, paint lasts much longer on COR-TEN Steel.

In transportation equipment USS COR-TEN Steel is noted for its long service life, low first cost and economical operation. Get the real facts on USS COR-TEN Steel from United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS and COR-TEN are registered trademarks.

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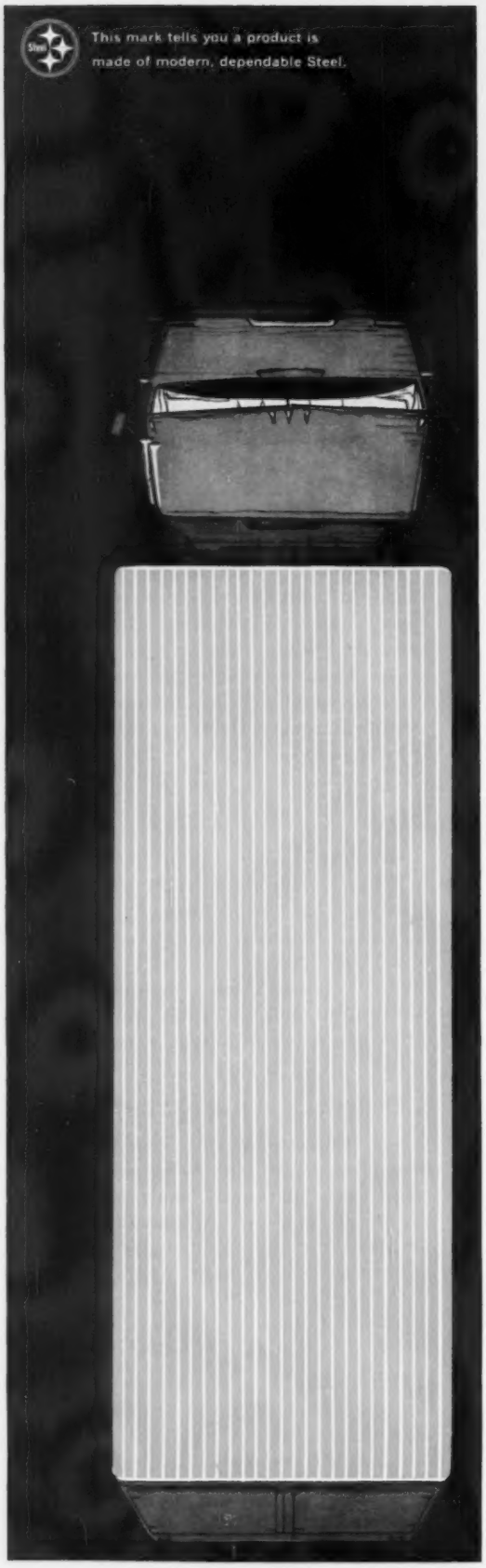
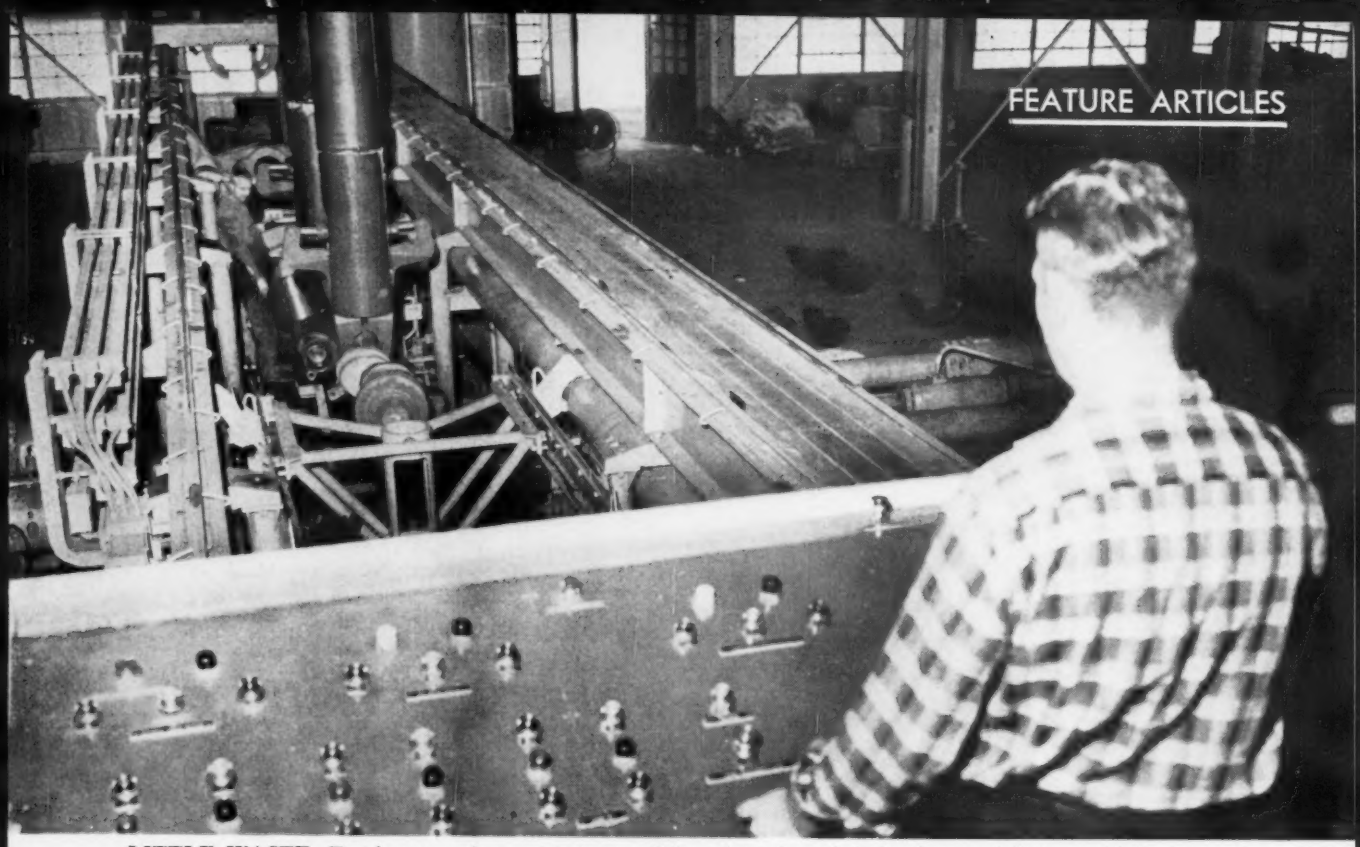
(USS) United States Steel





LITTLE WASTE: Forging complex converts round bars into shaped shafts that need little machining.

Multi-Directional Forging Unit Shapes Heavy Crankshafts

Combining upsetting and offsetting strokes, a multi-directional forging machine shapes diesel locomotive crankshafts.

All shafts are forged with controlled grain flow and distortion-free eccentrics.

■ The largest, most costly, moving part in an engine is the crankshaft. Diesel locomotives, pipeline-transmission engines and refinery equipment demand reliable heavy-duty crankshafts.

Until recently, the fabrication of these heavyweights created waste in several forms. Machining costs were high. Sometimes up to 60 pct of a shaft's forged weight became scrap in machining stages.

Now, a multi-directional forging machine helps to turn out precision die-formed shafts from round ingots on a production basis. This machine has completed extensive shake-down tests at the National Forge Co., Irvine, Pa. It yields precision-shaped forgings with controlled grain flow. These forgings are only slightly heavier than the finished crankshafts.

Double Duty — In essence, the horizontal closed-die forging machine integrates two double-acting presses that act on the same workpiece at right angles to each other.

Coupled with a 4000-ton upsetting stroke from the larger four-column press is an 1100-ton offset stroke. A smaller press, with C-frame construction, exerts the upsetting pressure.

Let's follow a workrun through the new forging complex. Fabrication begins with the melting of steel in a basic electric furnace.

Alloying takes place in the furnace, rather than in a ladle. This insures more homogeneous metal. And since electricity is used, no combustion impurities can enter the ultrapure metal.

The relative movements of the upsetting and offsetting presses are controlled through a hydraulic coupling. It can be preset to produce several desired relationships.

Sometimes it's desirable to upset

more from one side than from the other. In such cases, a proportioning device regulates the upsetting movements. This device insures uniform completion of the upsetting movements from each side regardless of stroke-length differences.

Controls are of the semiautomatic type. Each press can be closed manually under low pressures. High-pressure movements, on the other hand, are servo-assisted and automatically controlled. All high-pressure movements are preset at the control console.

Blow by Blow—Only one section of the crankshaft is formed in each forging operation. Here's the normal sequence. First a flange is formed on the round ingot.

A second forming operation produces the main journal, two webs and a pin journal. The result of this working stage appears as the third figure in a step-by-step illustration.

After the flanging operations are completed the ingot undergoes several throw-forging cycles. The fifth sequence shows the completion of the first throw-forging cycle. Normally six of these forging strokes are exerted in forging the throws of a diesel locomotive's crankshaft. Every throw is formed separately.

Collar-end forming wraps up the finished shaft. The larger press again comes into play to upset the end collar. This operation, the last figure in the sequence illustration, testifies to the versatility of the new forging complex.

Keep It Hot—Special induction-heating furnaces, designed and built by the Westinghouse Electric Corp., are used with National Forge's giant crankshaft forger. The coils in these furnaces heat bars from 5-13 in. in diameter. They also heat bar sections from 12-84 in. in length.

How long does it take to heat a bar to forging temperature? Naturally the heating time hinges on the bar's mass. It takes from 10-50 minutes to get a bar from room temperature to the 2300°F forging temperature. Here's a case in point. An 8-in. diam bar can be heated to forging temperature in only 14 minutes.

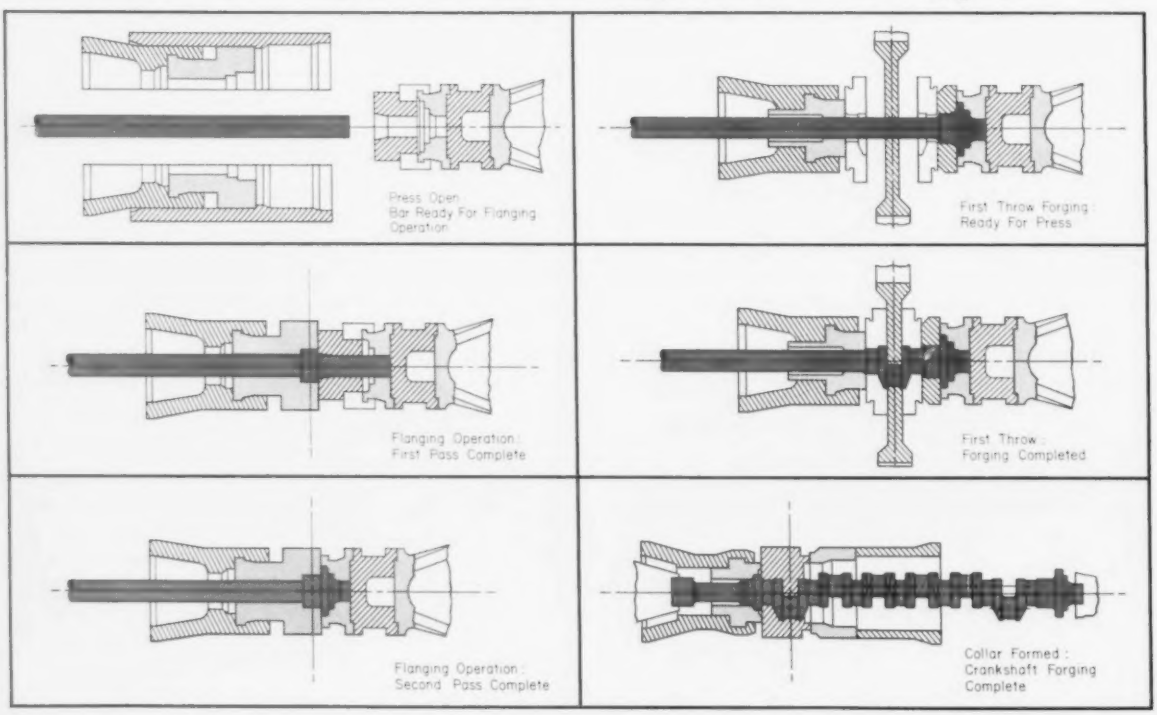
Fast Positioning—An overhead crane with a "stiff-leg" attachment handles all bars. The attachment on this crane is actually a pair of hydraulically-actuated columns. They're suspended on the crane's track and they have grabbing devices mounted on their lower ends.

These columns always operate in unison. The crane operator controls their height and horizontal positions. He varies these positions by using controls located at his fingertips.

Speed is a paramount factor in all handling stages. The novel handling arrangement allows quick transfers from the heating coils to the forging machine. It also insures vertical and horizontal alignment of each bar section as it's placed inside the forging complex.

For years, National Forge has been known as the company that forges, machines and rebuilds huge crankshafts. Several years ago, the company realized that growing demands for optimum quality and more economy in shaft production would eventually make crankshaft slab-forging methods obsolete.

How Round Ingots Are Forged Into Shape



Let's run through the old slab-forging methods. Each shaft was forged from a rectangular slab that weighed about two and a half times as much as the finished crankshaft. Machining costs were exorbitant. Here's why.

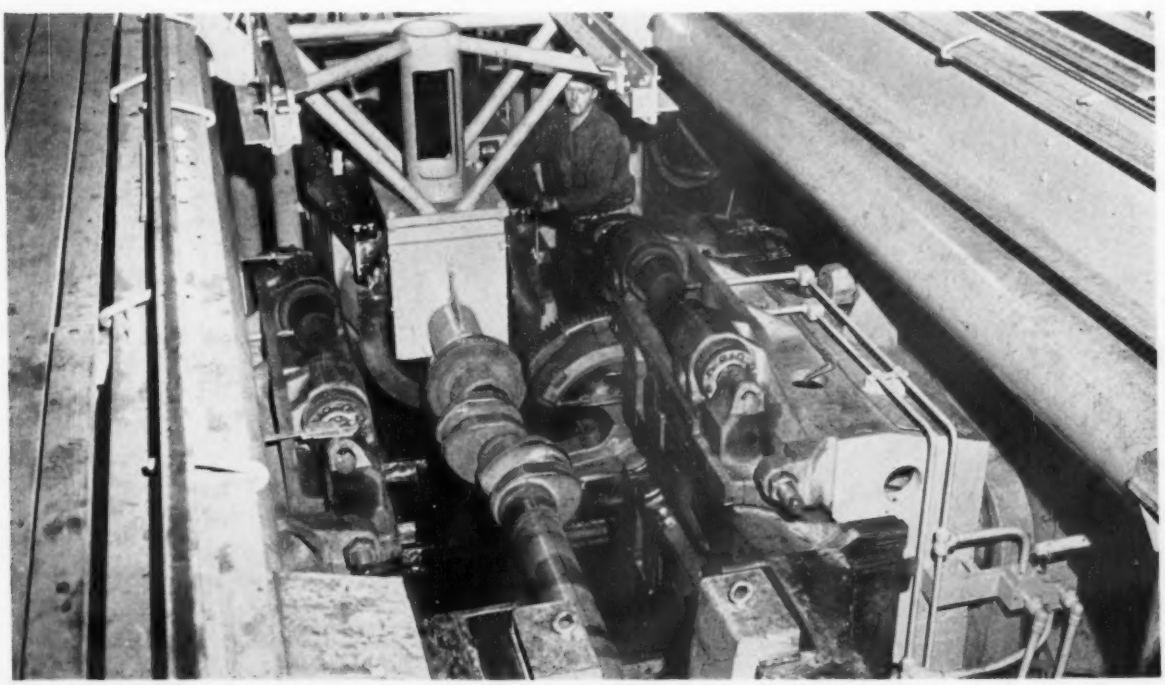
Former Method—Every crudely fluted slab had to be necked out on a lathe. In this operation, large rectangular sections were cut from each slab at preset intervals. The remaining metal along the bottom of the slab became the main shaft. The metal left uncut above the main-shaft portion became the throws.

Next, the rough crankshafts were locally reheated prior to twisting. One end of the slab was placed in a floor-mounted vice; the other was left free to turn.

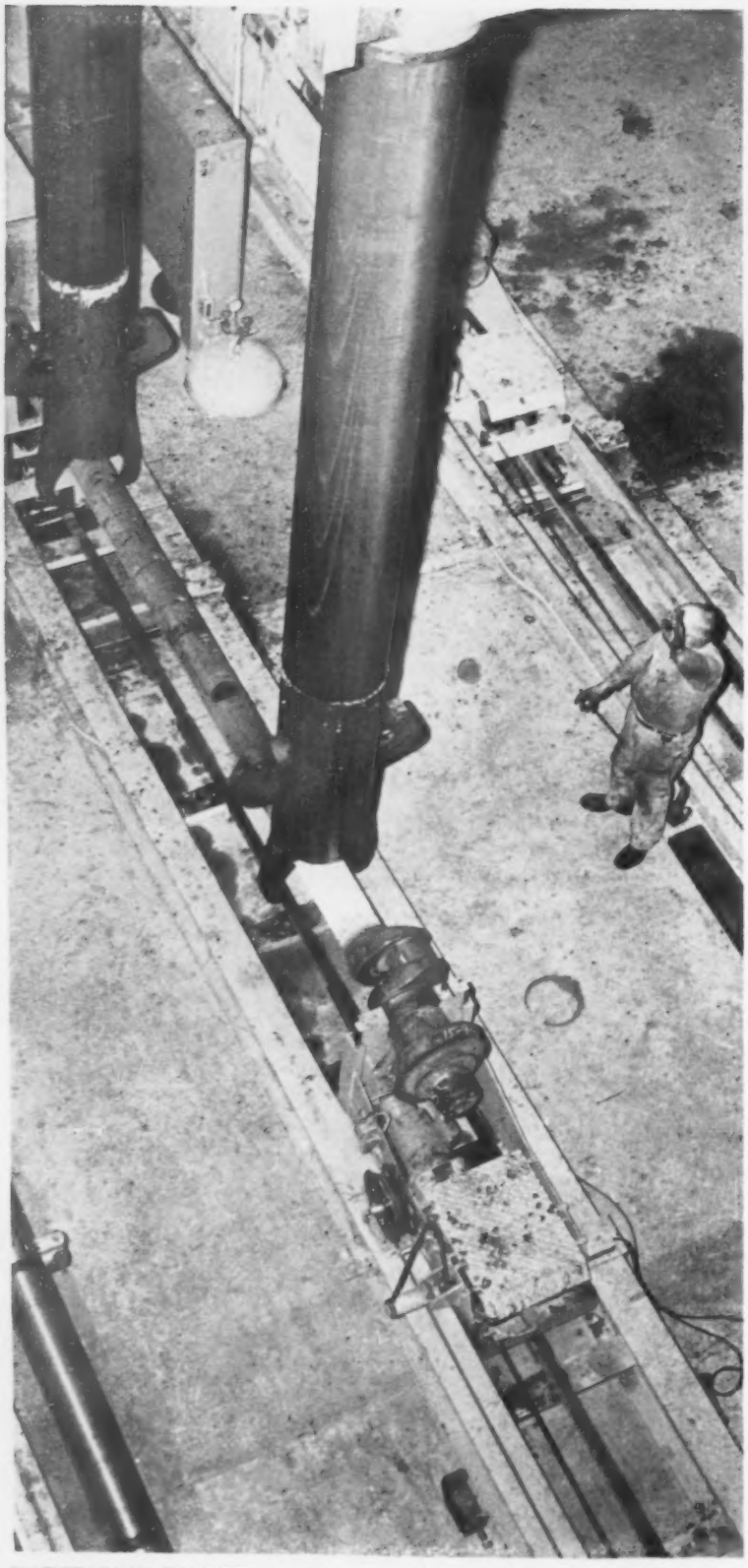
Each necked-out section then had to be locally reheated. The free end of the shaft was twisted until the proper angle for the crankpin and the web was obtained. With this old slab-forging method, every throw was individually formed in exactly the same costly manner.

After twisting, the crank was

GOOD GRAIN FLOW: Cross-sectional etch shows the grain-flow lines in a finished shaft. Hydrochloric acid was used as the etching solution.



FIRST THROW: After the first eccentric is forged, the bar moves back to the special induction heaters.



PARTIALLY FORMED: A bar on which a flange and one throw have been formed is positioned for forging. Six full sets of throws are forged. Previously, heavy-duty shafts were made from large rectangular slabs.

rough-machined in a lathe. Heavy cuts were taken across the entire surface. All of the decarb that encased the slab as a result of the oxidizing atmosphere was cut away. These cuts created another 5-pct metal loss.

Using the new forging complex, National Forge forms five complete crankshafts in an eight-hour shift. After the first throw is formed, every succeeding throw assumes its correct angular position.

Locks in Place—A positioning die locks the preceding throw in the correct position so that the throw being formed is in the correct angular relationship to adjacent throws. This eliminates additional heating and twisting stages.

Several advantages result from the use of the new forging complex. First, material is saved. Now, a typical crankshaft begins to take form with a round bar that's only about 30 pct heavier than the finish-machined shaft.

Another bonus centers on the fact that the bar's axial zone remains close to the shaft's neutral axis. This is very important in the highly-stressed areas of the main and pin journals.

The new forging complex produces a grain flow which runs parallel to the outer surfaces of the shaft. Thus, finish machining is effected without cutting across this grain flow. End result? Higher fatigue strength in critical areas.

Hot-twisting operations are now a thing of the past. Previously, hot twisting built up stress concentrations in the journal areas.

Induction heating curbs the old decarburization problems. This means only light skin cuts are needed to remove the heat-affected surfaces. These light cuts don't disturb a shaft's aligned grain flow.

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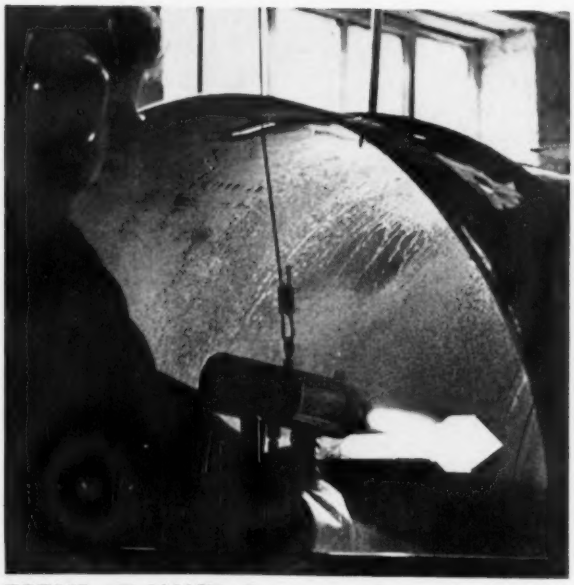


FORMS AT 3000°F: One way to form complicated, thin beryllide shapes is by flame spraying.

MANY SHAPES: A cone is one of the many shapes that can be fabricated from the new beryllides.

Beryllides: New Materials For Space Age Structures

Ideal Space Age materials must be light, strong at high temperatures, and oxidation resistant.

Beryllides, a class of intermetallics, are the new candidates for the role.

■ Development of a new class of materials which raises the top use temperature of Space-Age structural materials by about 50 pct was announced last week.

Developed by The Brush Beryllium Co., the new materials are known as beryllide intermetallics—made from beryllium metal chemically combined with a refractory metal. They're very strong and highly resistant to oxidation at 3000°F. Weight: About the same as aluminum.

Major Step Forward — "Beryllides represent a major step forward in the nation's urgent search for high-temperature structural materials," says Brush president, G. S. Mikhalapov. "They are ideally suited to withstand the heat and corrosive attack which are encountered in re-entry and in hypersonic flight."

The materials can be fabricated into specific shapes by a variety of procedures. These include vacuum hot pressing, cold pressing and sintering, investment and slip casting, isostatic pressing and flame spraying.

Parts such as cones, rods, tubing, plates, crucibles, blocks and bars

Some Key Features of Beryllides

Compound	Melting Point, °F	Density, g/cc	Modulus of Rupture (10^3 psi)					Oxidation (mils penetration in 100 hr.)	
			Room Temp.	1600 °F	2300 °F	2500 °F	2750 °F	2500 °F	2700 °F
$NbBe_{12}$	3070	2.91	22	—	45	40	22	0.9	2.0
Nb_2Be_{17}	3100	3.28	31	35	70	63	36	0.6	1.9
Nb_2Be_{19}	~3100	3.15	30	30	70	65	27	—	—
$TaBe_{12}$	3360	4.18	31	—	53	43	26	0.5	0.9
Ta_2Be_{17}	3610	5.05	30	40	78	56	35	0.3	0.9
$ZrBe_{13}$	3500	2.72	25	—	40	37	25	0.5	1.3
Zr_2Be_{17}	3600	3.08	25	—	40	40	35	0.5	1.2

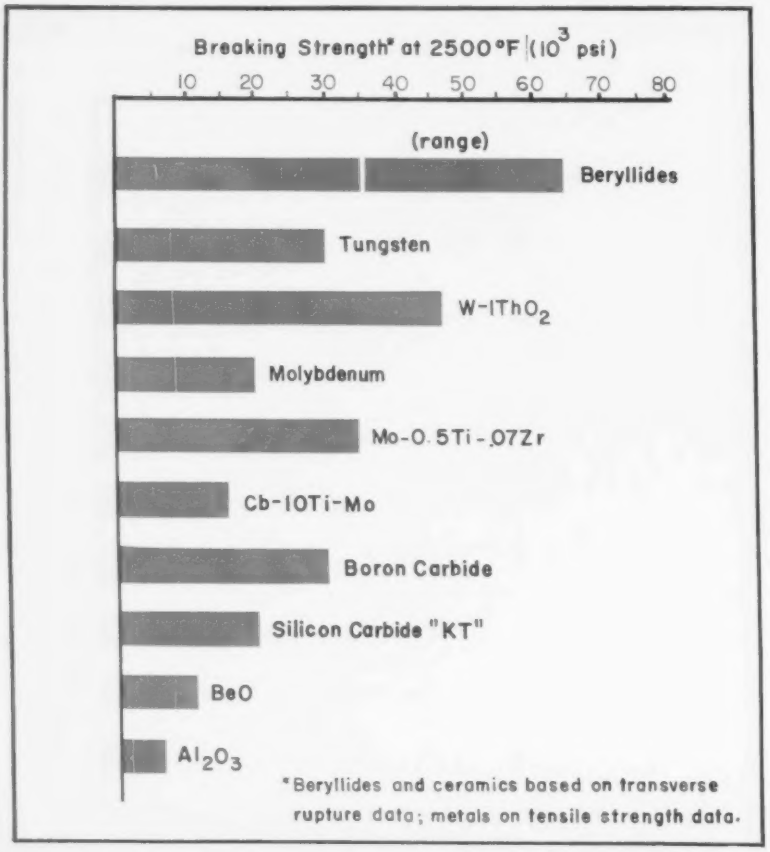
have been made in various sizes.

Key Properties—Lightness, high-temperature strength and resistance to oxidation are the key properties for use in such space and airborne applications as leading edges, wing and body panels, supporting structural members and other parts.

Mr. Mikhalapov points out that at the present time three other separate categories of materials are being considered for high temperature structural use: Superalloys, refractory metals and ceramics. Here's how they compare.

The first figure shows what might be called "breaking strengths" at 2500°F. Based upon tensile-strength data for the refractory metals and modulus-of-rupture data for the beryllides, carbides and oxides, the chart shows how these three groups compare generally in their ability to resist breaking of 2500°F.

Beryllides Extend Useful Range



COLD-PRESS POWDER: Another way to form a beryllide is to cold press the fine powder in a steel die. Resulting block is then sintered.

Tops the Superalloys—Top use temperatures of the new beryllides are nearly fifty pct higher than those of the superalloys. Beryllides are also much lighter, Mr. Mikhalapov adds.

Beryllides are extremely resistant to oxidation at high temperatures. Refractory metals, the Brush executive points out, cannot withstand oxidation at high temperatures for prolonged periods—even with the best available protective coatings.

Ceramics have maximum use temperatures much higher than the beryllides, according to Mr. Mikhalapov. But in the temperature-use range of the beryllides, the new materials are more than ten times as strong as the ceramics. The new compounds also possess high specific heat and good thermal conductivity—important properties for heat sink applications.

Streams of Air—In testing the ability of the beryllides to resist oxidation, the compounds were subjected to streams of air at high temperatures for 100 hr. Oxygen penetration of the specimens was then measured in terms of mils.

The oxides are, of course, superior to all others in their resistance to oxidation. But very close to them in this respect are the beryllides. Refractory metals have extremely poor oxidation resistance at high temperatures; this is one of their drawbacks.

Has Weight Advantage—The third key property so far as airborne and space applications are concerned, is specific gravity. Like their parent metal, beryllium, the beryllides have low specific gravities—ranging from 2.72 to 5.05.

Beryllides have a great weight advantage over such refractory metals as tungsten and molybdenum. As a group they are roughly equivalent in weight to ceramics, aluminum, and titanium.

Long-Term Program—The debut of the beryllides last week is the result of an Air-Force-contracted research program started at Brush Beryllium in 1956.

This contract called for a survey of the high-temperature properties of known intermetallic compounds and a search for new promising compounds. Object: To find intermetallics which would have potential structural use in air at 2300°F for long-term use—defined as 100 hr.

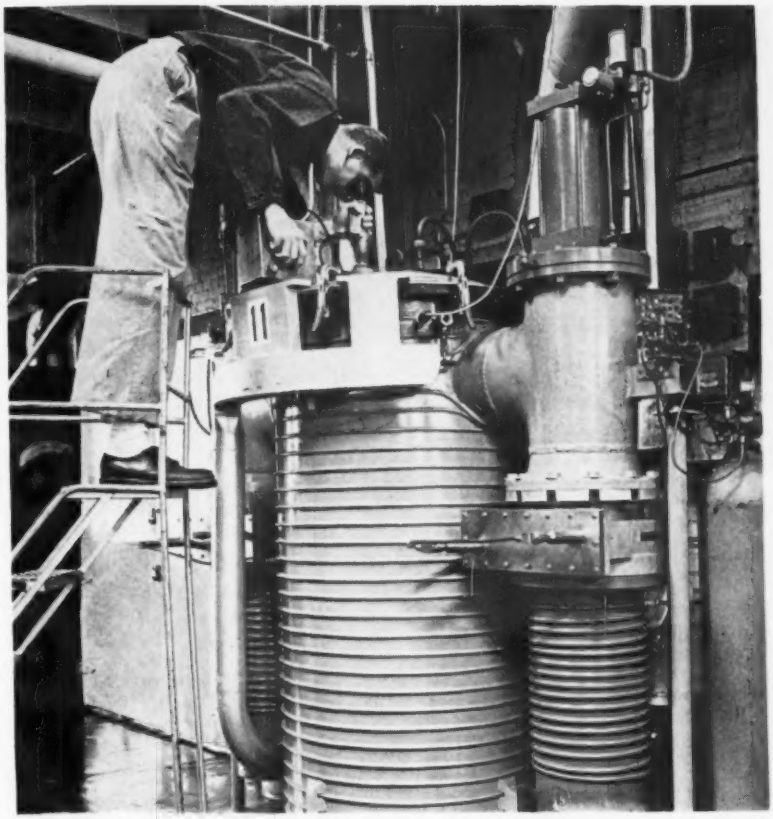
Over seventy-five different intermetallic compounds were tested by the Brush team. After two years of work, eleven compounds were selected as especially promising for high temperature structural use. Seven of them were beryllides.

Withstands 3000°F—The Brush researchers found that the top temperature for long-term—100 hour—use of the beryllides would be above 2700°F and that they could be used at 3000°F for periods approaching ten hours.

To convert constituent metals into a beryllide intermetallic compound, they are intimately blended in powder form and then reacted at elevated temperatures. (After the reaction, X-ray diffraction analyses show an entirely new crystal structure.) Grinding these reacted compacts to a powder forms the raw material from which specific shapes are produced.

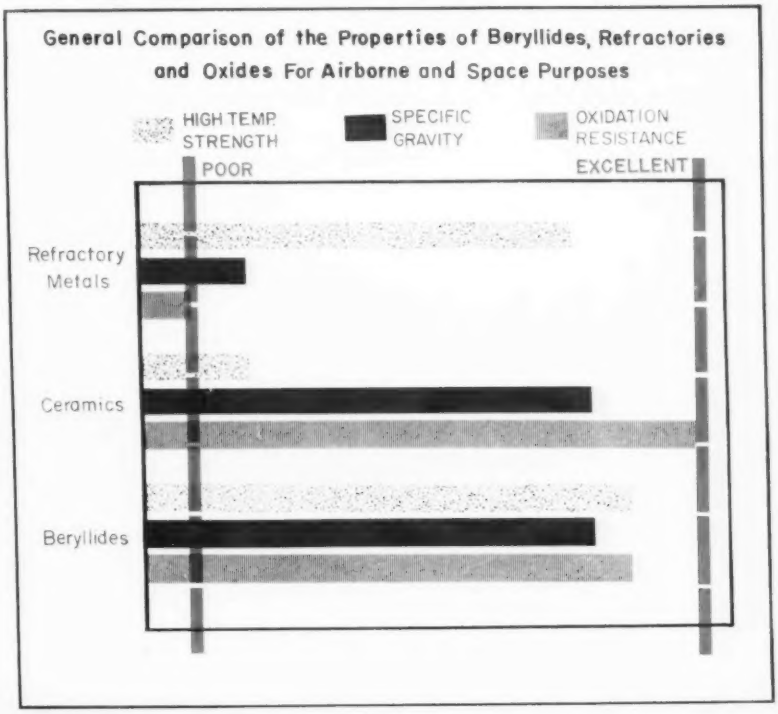
Develop Other Techniques—Development of fabricating techniques is proceeding at the present time, reports Brush. It's expected that the two tantalum beryllides will soon be available in a wide variety of forms; additional members of the beryllide family will shortly be made available.

Other beryllides for possible applications at high temperatures are being studied.



CHEMICAL REACTION: Technician measures temperature of furnace in which powders are reacting to form the new beryllium intermetallics.

Compare Candidates' Properties



Flux-Free Technique Solders Aluminum to Stainless

Gas-tight joints between stainless steel and aluminum can be made with commercially available soldering alloys.

Success depends upon proper cleaning and accurate heating.

■ A new procedure makes it possible to solder aluminum to stainless steel without flux. High-strength bonds can be made. There is no distortion of the pieces which are joined. In addition, the joint is free from problems of corrosion or destruction.

The procedure, as carried out by the Hanford Laboratories of the Hanford Atomic Products Operation, Richland, Wash., solved a joining problem for a thermocouple test assembly.

According to Hanford's L. C. Lemon, the specifications stated that the bond be made without the use of flux. The bond would have to be gas-tight in 120°F water and would have to withstand pressure up to 300 psi. A final inspection of the bond included a mass spectrometer leak test.

Vital Steps—The flux-free technique perfects the bond through proper cleaning and preheat. Both the aluminum and the stainless are first cleaned with an abrasive. Then the metals are washed in trichorethylene.

After washing, the procedure differs for the two metals. Stainless is coated with an equal-part solution of water and concentrated hydrochloric acid. This is followed by a 450°F preheat. Tinning comes next. This is done with a 50-50 lead-tin solder.

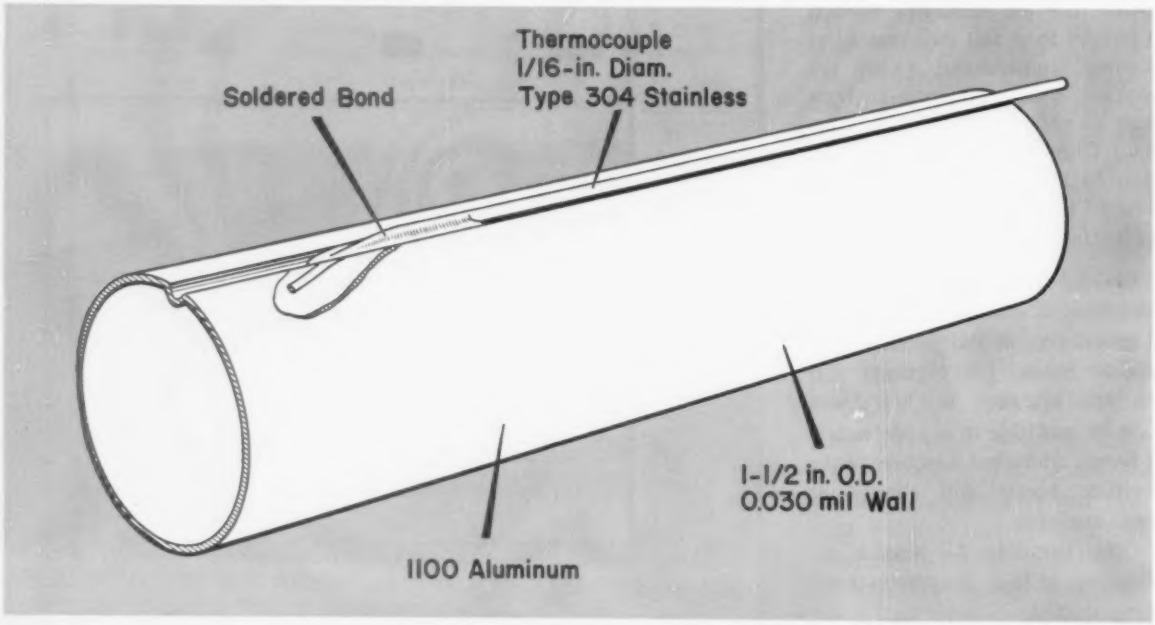
A hot water rinse rounds out the preparation of the stainless section. This is actually an insurance step in the event that preheating fails to remove all of the acid from the stainless surface.

Another Approach — Once the aluminum to be joined has been cleaned and washed, it is preheated to 650°F. Tinning is then done with a commercially available aluminum solder. This alloy contains 1 pct Ag, 0.01 pct Al, 0.01 pct Cu, 1 pct Fe, 1 pct Pb and 0.1 pct Si. The balance is tin.

The prepared surfaces are then placed in contact. So aligned, they are heated by an oxyacetylene flame to 500°-600°F. The strong joint is thus completed.

Soldering techniques for the joining of aluminum often produce unsatisfactory joints. This has been especially true when aluminum has

Soldered Bond Solves Assembly Problem



been soldered to other metals. Most methods tried to date have required the use of special solders—alloys that are usually rich in zinc and tin.

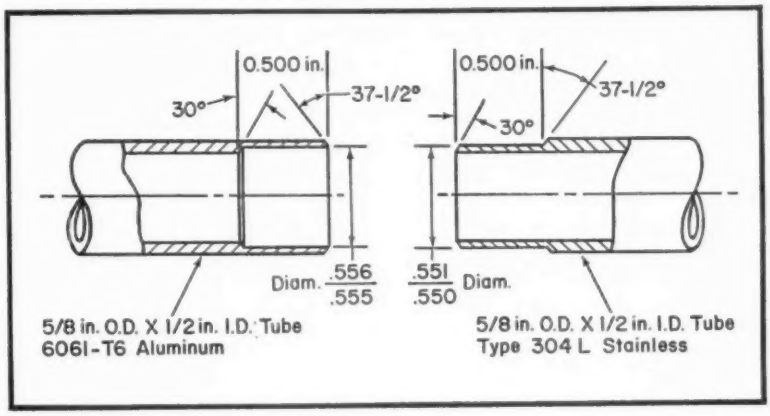
Rubbing Action — In one such method, the pieces to be joined are heated and butted together. At the same time, a bar of aluminum solder is rubbed along the joint surfaces. As soon as the pieces heat up to the melting point of the solder itself, the oxide film on the aluminum softens. The film is then scraped away by the rubbing action.

Intimate contact is also established between the cleansed portions of the two sections. Alloying starts at once. To apply this method, however, the surfaces must be accessible for the rubbing step. If the surfaces are beyond reach, then a flux must be used to keep the joint free from oxides during soldering.

Soldering fluxes usually contain salts. These salts tend to become occluded in the joint. When moisture is present, electrolytic action is liable to corrode and destroy the soldered joints.

There are times when you can electroplate the aluminum with copper prior to soldering. This approach will effect a strong joint, but it takes time and it can be costly.

How to Plan Tube-to-Tube Bond



Bad Marriage — Formerly, stainless had always been a very difficult alloy to solder to aluminum. To solder sections of 18-8 stainless together, for example, special fluxing steps are taken. Here fluxing is provided by zinc chloride-ammonium chloride containing hydrochloric acid or by orthophosphoric acid.

As in aluminum soldering, the occlusion of flux slowly corrodes and destroys the joint by electrolytic action in the presence of moisture.

The first drawing shows a typical bond between a stainless-steel thermocouple and an aluminum tube. The other drawing offers recommended specifications for a tube-to-tube bond.

Representative strengths of soldered aluminum to stainless joints are revealed in the table. You will note that rupture occurs in the aluminum base metal, not in the soldered joint.

Dissimilar Metal Bonds Show Strength

MATERIAL	Specimen Size, in.	Area of Soldered Joint, sq in.	Breaking Strength lb	Breaking Strength psi	Location of Failure	Shear Stress in Lap Joint, psi
304 SS to 6061 Al	0.555 diam x 0.035 wall	0.785	3120	47,300	Al tube	3960
304 SS to 6061 Al	0.555 diam x 0.035 wall	0.785	3100	47,000	Al tube	3950
304 SS to 6061 Al	0.555 diam x 0.035 wall	0.785	3050	46,200	Al tube	3950
304 SS to 6061 Al	0.555 diam x 0.035 wall	0.785	3120	47,000	Al tube	3890
304 SS to 6061 Al	0.555 diam x 0.035 wall	0.785	2980	45,200	Al tube	3760
304 SS to 6061 Al	0.555 diam x 0.035 wall	0.785	2990	45,300	Al tube	3810
304 SS to 1100 Al	0.030 x 1.0 flat stock	1	520	17,300	Al sheet	520
304 SS to 1100 Al	0.030 x 1.0 flat stock	1	525	17,500	Al sheet	525

Cathodic Protection Research Pinpoints Piling Failures

Salt water corrodes and eats away millions of dollars worth of steel piling every year.

Reports from Hawaii to Massachusetts prove the value of cathodically-protected piers.

■ The corrosion of steel piling in marine exposures is a major problem to the Bureau of Yards and Docks. The U. S. Navy's harbors are located throughout the world. This means steel piling must be maintained under a wide range of environmental conditions.

Steel pilework which extends from below the mud on a harbor floor into the atmosphere above the tidal range undergoes varying rates of corrosion over each pile's length.

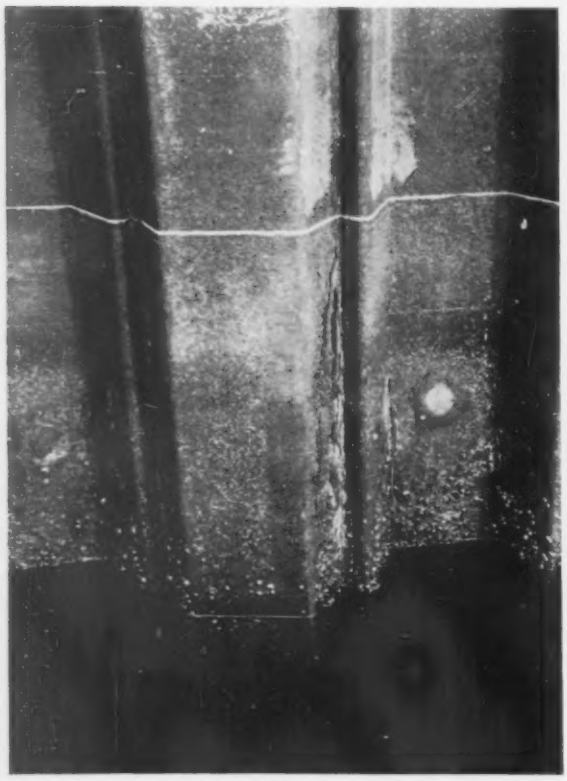
Splash Zone—Where do the most savage corrosive attacks occur? Left unprotected, steel piling corrodes most rapidly in the splash zone. This is the area above the high water mark. Sometimes, the mud-line area also shows signs of accelerated attack.

How can the ravages of salt-water corrosion be curbed? Cathodic protection is effective in guarding piling that's constantly wet. However, the extent to which this protection carries into the tidal and splash zones hasn't been clearly defined.

Recently, the Bureau of Yards and Docks began a thorough investigation to pinpoint the extent of steel sheet-piling deterioration at eight Naval harbors. Samples were cut from individual piles. Then a patching-plate assembly was used to plug each hole.

Field Tests—Reports were sent in from each harbor along with the cut samples. On one point, every report agreed: The highest rate of corrosion occurs in the region of periodic wetting by sea water.

Peak corrosion builds up in the splash zone about 2 ft above mean-high-water (MHW) level. A secondary high corrosion rate occurs in the anodic area about 2 ft below



KEY WEST TO SAN DIEGO: Coated section of piling (right) shows the effects of pitting at Key West Naval Station, Florida. A close-up shot illustrates one of the peak corrosive zones on a San Diego pier (left).

mean-low-water (MLW) level.

The average corrosion rate at one-half a pile's depth is low. It's about 3.6 mils per year (mpy). Corrosion rates from about a foot above to 3 ft below the mud line are also low. They average 2.2 mpy at the mud line.

Corrosion rates from mid tide to 3 ft below the mud line are most uniform at Puget Sound. At this harbor, cathodic protection has been in use for six years.

Simple Cathode—Cathodic protection makes a metal surface the cathode. This protection reverses the natural corrosion processes. Under ideal conditions, it completely protects steel from corroding.

One large pier costing about $4,000,000 had an expected life of 15 years without protection. Cathodically protected, this pier will probably last 50 years.

The installation of cathodic protection on this pier cost about $96,000. Another $6300 per year is spent for operation and maintenance of the cathodic equipment.

This raises the total cost of the protected pier to about $4,411,000 over a 50-year period. Thus the annual depreciation cost is about $88,200 over 50 years versus $267,000 for a 15-year expected life.

CHECKS PILING: Test samples are cut from preselected areas on the steel piling. All samples are then checked out in a central laboratory.

Sea Water's Role—Cathodic protection of steel piling hinges on good electrical conductivity. The resistance of sea water is quite low. This makes it an ideal conductor. In the tidal area, electrical conductivity between an underwater anode and the steel piling occurs only where continuity exists between the sea water's surface film on the piling and the main body of water.

Solution-potential measurements made on uncoupled steel specimens show that plates in the tidal zone are strongly cathodic with respect to plates which are constantly under water. When they're electrically coupled, a continuously-immersed plate or steel specimen acts as a sacrificial anode for steel pilework in the tidal zone.

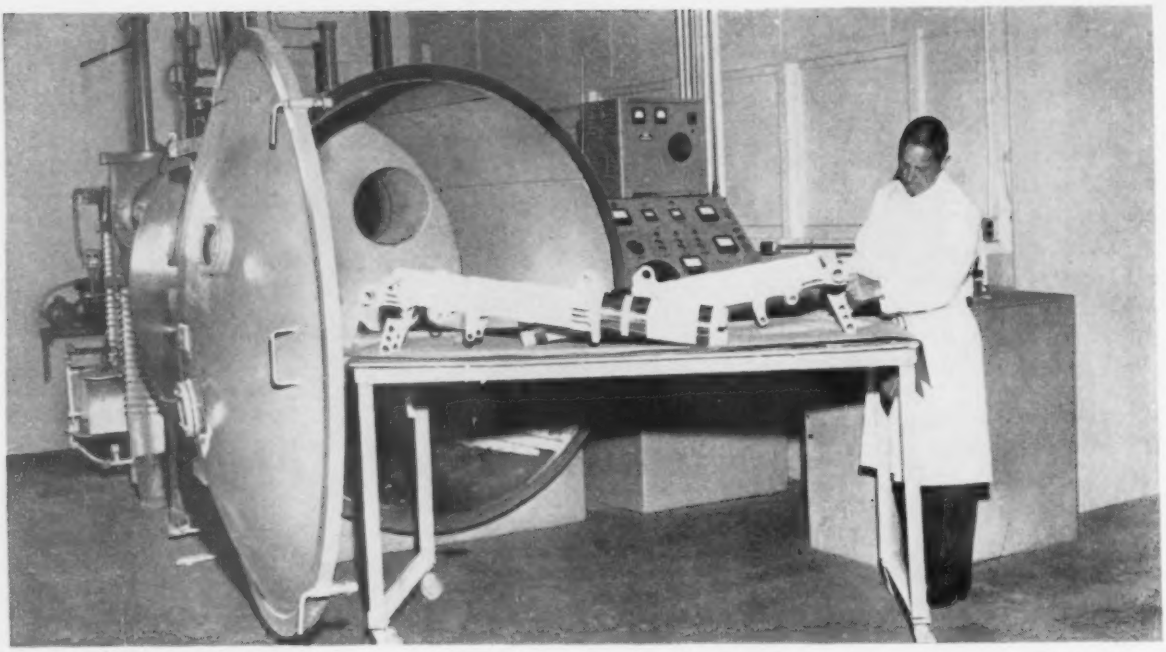
Many factors affect the electrochemical processes of corrosion. Mill scale is cathodic to the metal. The faces of metal crystals are cathodic to the edges. Metal grains with low carbon content are cathodic to metal grains of higher carbon content. Corrosion potentials as high as 0.2 v result from these heterogeneities.

Natural Protection—As sea water temperatures rise, fouling growth rates increase. The corrosion of unprotected steel also increases as the water temperature rises. Normally, these factors work against each other. Excess fouling protects the steel and helps to curb corrosive buildups.

In a piling section that serves as an anode, electrons flow from the anodic area (underwater) through the steel to the piling's cathodic area. These electrons release hydrogen from the water at the cathode's surface.

Calcareous deposits produced by the cathodic current retain cathodic hydrogen. This reduces the corrosion rate. It also cuts down the current needed for cathodic protection.

With no protection, oxygen removes the polarizing layers of hydrogen. In such a case, corrosion continues in the anodic area. Bacteria can also cause cathode depolarization through reduction of sulphate ions.



FINAL INSPECTION: High stress steel landing gear parts move out of the vacuum chamber for inspection.

Cadmium Coating Under Vacuum Curbs Hydrogen Embrittlement

Strategic steel parts, destined for space, can get the surface protection they need from uniform coats of cadmium.

When applied in a vacuum, hydrogen embrittlement in the steel is eliminated.

■ One way to end the problem of hydrogen embrittlement during the plating of steel is through the vacuum deposition of cadmium. This technique is especially useful for steel parts in spacecraft.

At Anadite, Inc., South Gate, Calif., a new vacuum chamber has been put into operation. It is said to be the largest ever designed for the company's Vac-Cad process. Anadite developed the process in conjunction with Lockheed Aircraft Corp.

Among the many parts which are coated in the new chamber are pressure vessels up to 15 in. diam, landing gear shruts, forward cockpit latches, fittings for catapult and fuel tank support hooks. Other parts include springs, nuts and bolts.

Good Throwing Power — The Vac-Cad process has excellent "throwing power." It will coat a ¼-in. diam blind hole to a depth of one inch. Coverage is complete. Internal threads are coated equally well.

The vacuum method assures uniform deposits of 0.0003 to 0.0015 in. Recently, the Department of Defense released a specification, MIL C-8837, which covers the process.

Parts are suspended in a vacuum chamber. The cadmium is vaporized beneath the parts. At no time is current passed through the parts. Throughout the plating sequence, the parts remain at room temperature. Steel parts, 180,000 psi tensile strength and above, are being coated on a daily basis.

Redesigned to Suit — The new vacuum machine is a Stokes 6-ft diam unit which was redesigned by Anadite engineers for the Vac-Cad process. It's a four pump unit and it operates on a 10 minus 7 micron vacuum. Chamber capacity depends upon shape and size of the parts. It will handle one large part or up to 1000 small parts.

According to Anadite, the throwing power of vacuum plating far exceeds that of electrolytic plating. As a result, there are virtually no problems of solution entrapment with the vacuum technique which might lead to the dissolution of the base metal.

The developers of the process also point out that the corrosion resistance of the Vac-Cad film ex-

ceeds that of electrolytic plating. It also more than meets the requirements of the military specifications for cadmium plating.

Outside Work—Among the parts which receive Vac-Cad coating are the air starter bottles for the Lockheed P3V-1 Navy anti-submarine aircraft. Two of these bottles are are located under each outboard nacelle. They supply compressed air to the burner where fuel is added, thus turning the turbine engines over. The coating is 0.0015 in.

Many parts receive a coating of 0.0003 to 0.0005 in. thick. Sizes of parts vary widely. Landing gear struts measure 57 x 30 in., for example. Forward cockpit latches are 8 x 6 in. and fittings for catapult measure 3 x 10 in. Fuel tank support hooks receive a similar coating on their 7 x 8 x 2½ in. configurations

Anadite does not recommend cadmium coatings on parts which will be subjected to service temperatures of 500°F or higher. Neither should cadmium be plated on parts which come in contact with other parts that are exposed to these higher service temperatures.

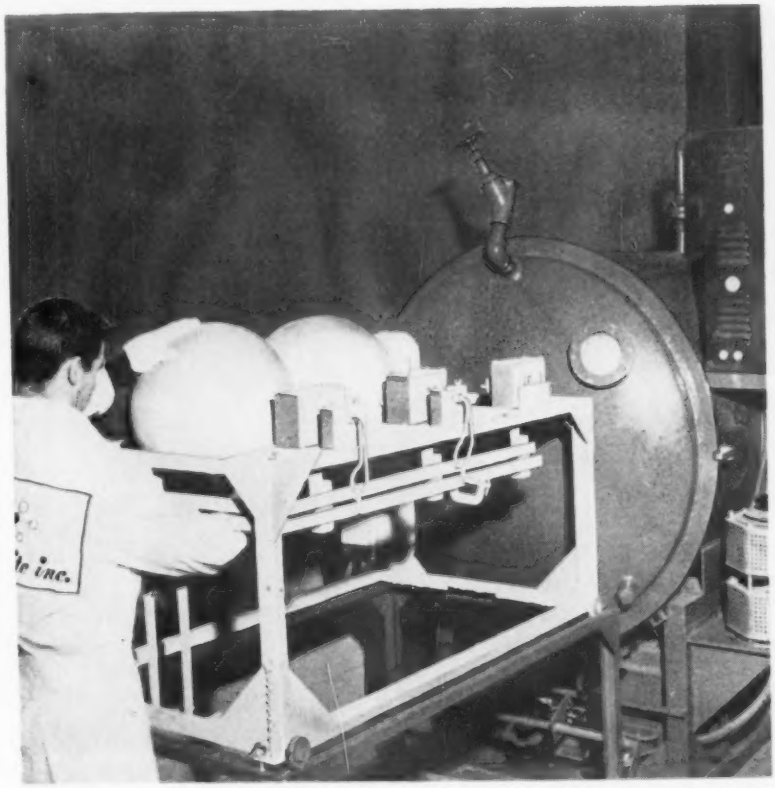
The Harder Parts—It's also recommended that parts whose hardness exceeds Rc 40 should be heat treated for stress relief prior to cleaning and coating if they contain objectionable residual stresses.

Those parts within the tensile range of 180,000 and 240,000 psi which have been exposed to a hydrogen contamination process should also be heat treated.

The recommendation calls for exposure to 375°F (±25°F) for at least three hours prior to coating. Baking time for parts with tensile strengths beyond 240,000 psi should be eight hours.

Severe Testing—Anadite subjects coated parts for strategic use to severe corrosion tests. Those parts which are plated within the thickness range of 0.0003 to 0.0005 in. are given a 192-hour salt-spray exposure.

LARGER WORKPIECES: Elevon parts are inspected after receiving 0.0005 in. coating from the plating process. Parts measure 15 x 12 in.



STARTER BOTTLES: Plating can be carried out on 15-in. diam air starter bottles. These bottles are fitted onto anti-submarine aircraft.

Compaction Press Forms Anodes

Powdered-metal parts often call for inserts. Thus, a press must be designed to do several jobs.

Here's a multi-compaction press, tooled to produce over 1600 capacitors per hour.

■ A hydraulic compaction press is being used by Western Electric Co., New York, to study production methods on tantalum anode capacitors.

This multi-compaction press, designed and tooled by Denison Engineering Div., American Brake Shoe Co., Columbus, O., will produce 28-30 parts per minute.

Tighter Specs—In recent months, tight Government specifications have been placed on tantalum anode capacitors. It's important to carefully control material density, eliminate contamination, and at the same time set production rates which fulfill quantity requirements.

Earlier production methods consisted of manually filling a die cavity with tantalum power; then placing the anode wire in position with tweezers. However, this method only yields four to five capacitors per minute, with lots of powder loss due to spillage.

Hits Home—The new hydraulic press is a 1-ton top- and bottom-ram unit. It's enclosed with a plastic panel unit during production.

It's powered by a 3-hp, 1200-rpm electric motor. This motor drives a split-flow hydraulic-vane pump. All hydraulic controls are mounted on a manifold.

Upper and lower rams can be individually actuated for setup or changeover. Electrical controls are mounted on the front of the press, just above the work area.

Dual Feed—As the top ram de-energizes and returns to the start position, the powder horn swings over the die cavity. Here, it's filled with the required amount of tantalum powder. At the same time, the last completed anode is pushed clear of the press.

The top-ram punch enters the die cavity, compacting the powder against the bottom ram. Simultaneously, a tantalum lead wire is cut to size by a cam-operated shear, located in the top ram. The wire is then automatically placed in the anode.

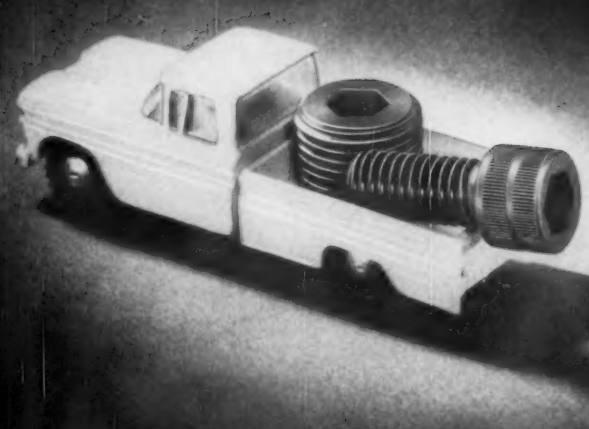
The top ram de-energizes while the bottom ram ejects the completed anode. The powder horn again sweeps away the part to complete the production cycle. The entire cycle takes about two seconds.

Close Control—Even in volume production, the press holds anode length to ±0.002 in., and weight to ±0.01 g. Since density (the relationship between weight and size) directly affects the anode's electrical characteristics, tolerances affecting weight and length are very important.

Currently, tantalum wire is being inserted in the powder at depths up to 3/16 in. The smallest anode produced is 0.09 in. in diameter and 0.102-in. long. Another is 0.125 in. in diameter and 0.225-in. long. The largest is 0.185-in. diam x 0.44-in. long.

COMPLEX TOOLING: The automatic compaction press fills its die cavity with powder, cuts and feeds a lead wire, and forms an anode to exacting tolerances. The entire cycle takes approximately two seconds.

Think Delivery . . .



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NEW PATENTS

Steel Processing

Steels and processing method, E. S. Nachtman (assigned to La Salle Steel Co.), Sept. 26, 1961. To improve the properties of non-austenitic steel which has a pearlitic structure in a matrix of free ferrite, the steel is extruded in a cold reduction step. It's then further extruded at a temperature above 200°F. U. S. 3,001,897.

Test for Cast Iron

Testing method to find the saturation value of gray cast iron, R. Ziegler and R. Gerstner, Oct. 10, 1961. To rapidly determine the saturation value of gray cast iron, ultrasonic impulses are directed through the piece at a preselected, constant, cooling temperature. The resulting impulse speed is plotted against Brinell hardness to determine apparent thickness. After this value is divided by the mechanically-ascertained true thickness, the saturation value is found by further calculation and plotting. U. S. 3,003,352.

Tough Stainless

Stainless steel, H. Tanczyn (assigned to Armco Steel Corp.), Sept. 19, 1961. This stainless steel has good toughness and impact strength yet it's amenable to the production of intermediate hardness values. It consists of 10-14 pct Cr, 0.07-0.14 pct C, 0.1-1.25 pct Mn, 0.001-0.05 pct each of P and S, 0.1-1 pct Si, up to 1 pct Ni, 0.05-0.35 pct Cb and/or Ta, 0.05-0.15 pct V, and the balance essentially all Fe. U. S. 3,000,729.

Decarburizing

Decarburizing process for alloy steels containing chromium, J. B. Bridges (assigned to Cameron Iron Works, Inc.), Oct. 10, 1961. In the low-temperature decarburization of chromium-steel melts containing not more than 0.75 pct C, the melt is blown with dry air or a mixture of oxygen with air or an inert gas. The temperature of the melt during the blow is maintained in the range 2800-3150°F. U. S. 3,003,865.

Sintering

Sintering of endothermic materials, K. Meyer and H. Rausch (assigned to Metallgesellschaft A.G., Frankfurt on the Main, Germany), Oct. 10, 1961. In the sintering of iron ore on a sinter band or grate, hot gas is drawn through the bed to ignite the contained fuel and form a melting zone in the bed. A cooler gas is drawn through the bed to limit the width of the melting zone. Then another hot gas is drawn through the bed. U. S. 3,003,863.

Fine-Grained Steel

Fine-grained steels, T. Ototani (assigned to The Research Institute for Iron, Steel & Other Metals of The Tohoku University, Sendai City, Japan), Sept. 19, 1961. In the manufacture of a tough, machinable, fine-grained steel, the molten steel is admixed with an optimum proportion of an alloy consisting of at least 10 pct Fe, 5-40 pct Ca, and 5-55 pct each of Mn, Si and Al, whereby 0.001-0.05 pct Ca is retained in the casting. U. S. 3,000,731.

Ferrous Separation

Process for obtaining ferrous metals and alloys from their ores, A. Greffe (assigned to Soc. d'Electro-Chimie d'Electro-Metallurgie et des Acieries Electriques d'Ugine, Paris, France), Sept. 26, 1961. Patent covers a process involving the electric-furnace fusion of iron ore, e.g., nickeliferous iron ore, to produce low-carbon ferrous metals or ferro-alloys, such as ferronickel. Molten metal in the furnace is overlain by a layer of an oxidizing slag. This prevents overheating of the metal and completes the oxidation of the reducing agent. U. S. 3,001,863.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

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Beautiful, protective finishes on tough Malleable iron castings will give your products a superior combination of appearance, ruggedness, and economy. Get complete information on this sales-getting combination from any of the progressive companies that display this symbol —

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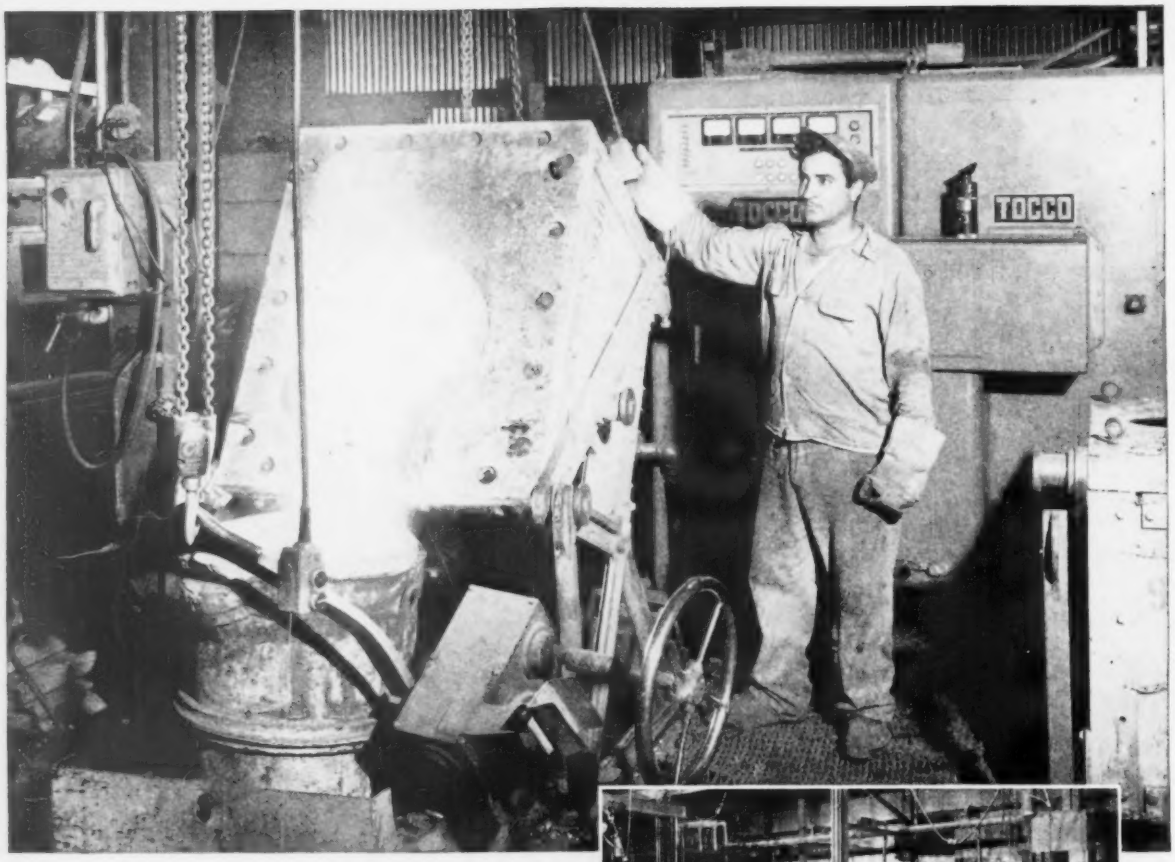
The castings shown have been painted, blued, chromium and cadmium plated, plastic coated, porcelain enameled, galvanized, and machined.



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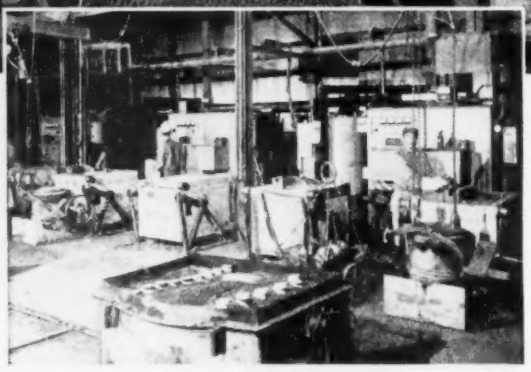

Six 600 pound TOCCO melting furnaces are powered by 700 KW of 3000 c.p.s. power at Commercial Shearing and Stamping Company, Youngstown, Ohio.

Steel casting backlogs at Commercial Shearing and Stamping Company used to lag from 8 to 10 weeks behind production schedules. By installing six 600 pound TOCCO melting furnaces, melting capacity was upped to 50,000 pounds a day—with just three operators.

Among advantages of TOCCO Induction melting are: (1) fast heating cycles—just 48 minutes for a 600 pound charge; (2) accurate control—TOCCO's completely automatic heating assures uniformity of castings; (3) cool, clean working conditions compared to conventional foundry heating methods.

If you're interested in maximum quality control, lower operating cost and rapid melting, it will pay you to learn more about TOCCO Induction melting.

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New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Saw-Leasing Data

Machine-tool leasing is described in a 4-page bulletin. It discusses five principal advantages of the rental plan: No capital expenditure is required; profit-producing equipment is available when needed; established lines of credit are undisturbed; profits pay for rentals; and the lease contract is handled locally. (The DoAll Co.)

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Investment Casting

In handy pocket form, a new folder entitled "Quick Facts" is available for regular and prospective users of investment castings. The two-color flyer lists the major advantages of the lost wax process for producing machine parts from almost any desired alloy or metal. Included are tables for determining general tolerances, flatness, straightness, concentricity, roundness, accuracy of angles, hole positioning, keys and keyways, parallel sections, wall thicknesses, and surface finish values. (Hitchiner Mfg. Co., Inc.)

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Tool Digest

In four fact-filled pages, an illustrated digest details a complete line of tools specially designed for boring, recessing and threading operations. (Bokum Tool Co.)

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Air Cylinders

Here's a new manual that illustrates and describes the operation and application of air cylinders. The 16-page book is packed with engineering drawings and specifications of the eight mounting styles. (Rivett Lathe & Grinder, Inc.)

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Stainless Heat Treat

How to heat treat 17-4 PH stainless steel is the subject of a new data folder. The folder has been produced in handy wall-chart form. This makes it especially useful to heat treaters and others working with this precipitation-hardening stainless-steel grade. Six specific heat treatments are covered (Armco Steel Corp.)

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Guide to Plastics

Reinforced plastics production methods are the subject of a new 16-page booklet entitled, "Guide and Data for Engineers and Purchasing Agents." Six basic molding procedures are discussed, together with advantages and applications of each. Tabulations present physical and chemical properties of parts produced by the different techniques. (The Society of the Plastics Industry, Inc.)

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Business Machines

Redesigned and enlarged with additional data processing applications for its sixth edition, "IDP Products in Action," presents 32 pages of systems applications involving tape-operated business machines. (Friden, Inc.)

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Gas Generators

Fully illustrated with charts, drawings and photographs, an eight-page booklet explains how a line of generators operate to produce inert gases economically. In the process, these generators act to prevent fire and explosion, improve products and increase production. The catalog lists specific uses of inert gases and features a diagram

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Gold-Alloy Baths

A new instructional booklet on antimony, indium, and gallium gold-alloy baths gives full information on equipment, preparation procedures, formulas, operation data, and replenishment needs. The formulations are specifically designed to impart the most desirable concentration of impurities in the gold electroplate to insure maximum semi - conductor qualities. (Technic, Inc.)

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Walkie Moves Stock

This new, 6-page circular describes a high-stacking, 2,000 lb. capacity walkie with a built-in charger. A self-contained powered time saver and auxiliary workhorse for transporting, stacking, loading and unloading in plants, warehouses and stores, the walkie is clean, compact and fume free. (Lewis-Shepard Products Inc.)

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Rotary Air Pumps

This six-page bulletin covers a new series of four-vane air pumps. The pumps provide a range of vacuum to 26 in. Hg., pressure to 13 psig and volumes from 12-54 cfm. Performance curves based on horsepower and cfm, plus dimensional data are also included. (Leiman Bros., Inc.)

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Industrial Heaters

Electric heating elements, ranging from simple straight tubulars to intricate custom-engineered designs featuring forming or fins, are given comprehensive treatment in a newly-released bulletin. (Heatrex, Inc.)

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Tool Selector

Developing specific recommendations for a plant, for a series of operations or for an individual turning job encompasses many factors. No blanket rule will cover all cases. Engineers, trained in taking the many factors into consideration in application engineering of on-end, throw-away or flat tools, have now compiled an eight-page booklet which contains an objective discussion on how to select the best type of carbide turning tool. For a free copy write on company letterhead to Wesson Corp., 1220 Woodward Heights Blvd., Ferndale 20, Mich.

Contact Gas Heating

Literature on a new development, the engineered application of electric heat to the direct contact heating of gases, is now available. A four-page illustrated brochure provides all the details on design, construction and usage. (Hynes Electric Heating Co.)

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Need A Footswitch?

On display in a new four-page catalog is a complete line of power footswitches. Designed for all industrial and commercial applications, the footswitches are available in a full range of sizes and types. (Linemaster Switch Corp.)

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Nonferrous Castings

A colorful new six-page brochure illustrates and describes many applications for precision-machined, nonferrous centrifugal castings. The process is said to produce dense, fine-grained, flawless castings within a wide range of alloys. (Sorensen Industries, Inc.)

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Testing Equipment

The latest developments in physical testing and balancing machines are described and illustrated in a new eight-page brochure. This issue of Tinius Talks includes details on a 1,200,000 lb. universal testing machine, and on a new sheet-metal ductility tester with a recorder for plotting load versus depth of cup as well as many other items of interest. (Tinius Olsen Testing Machine Co.)

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Tape Certifier

A new 2-page bulletin describes an automatic inspection system that locates defects likely to cause loss of information in tapes used for computers, instrumentation, telemetering, and control systems. The literature explains operating principles and gives performance specifications, dimensions, and power requirements. (Cybetronics, Inc.)

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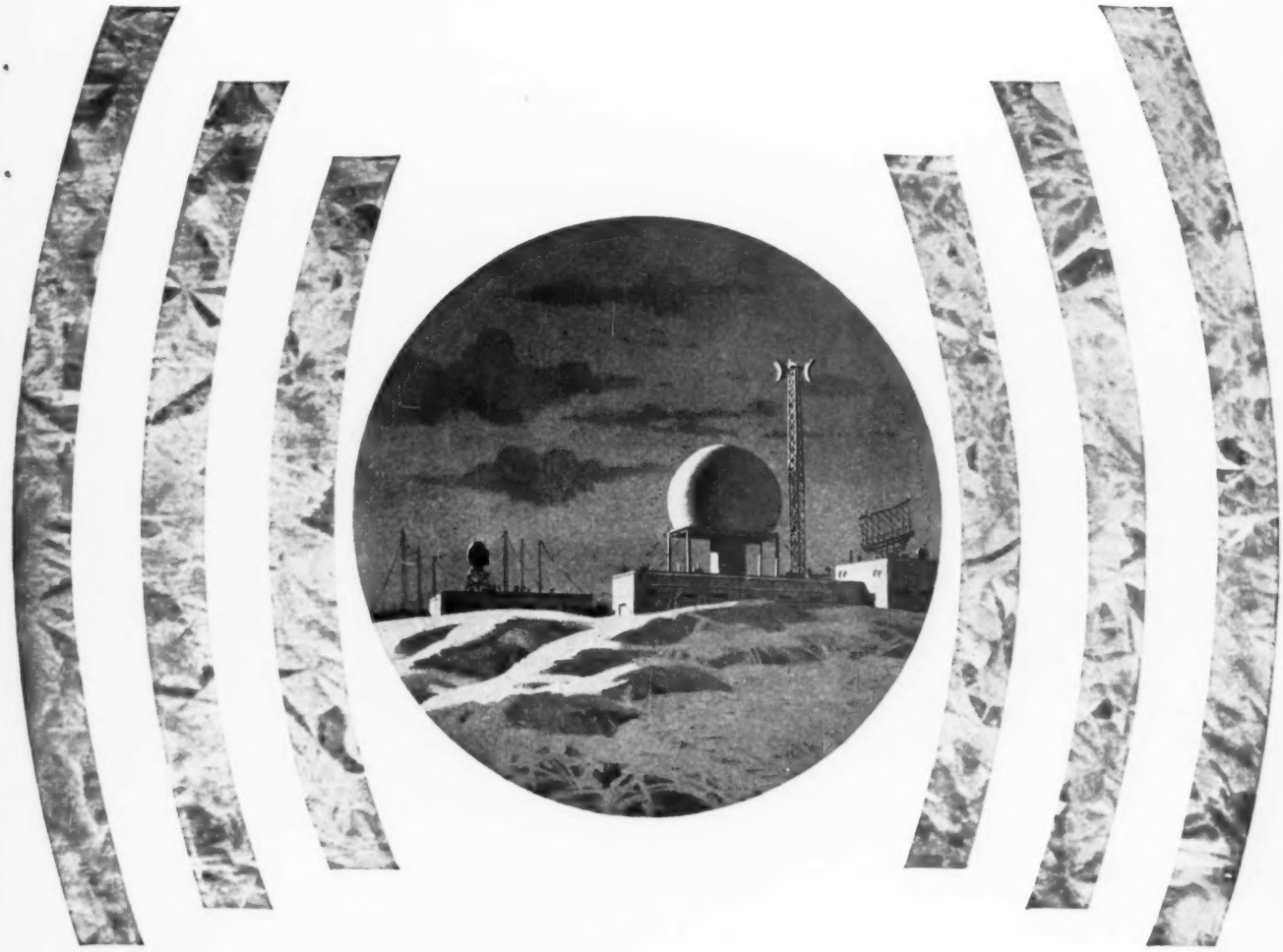
U.S. Air Force DEW-Line buildings fend off corrosion . . .



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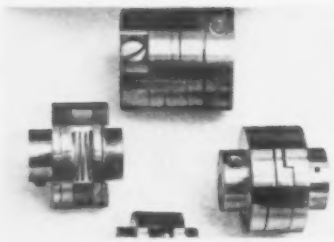
NATIONAL STEEL CORPORATION

New Materials and Components



Off-the-Shelf Couplings Handle Misaligned Shafts

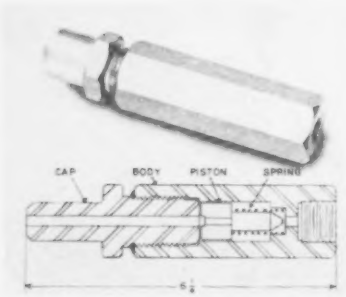
Manufactured to precision tolerances, a new line of couplings can be used with shafts which are axially misaligned by as much as 1/32 in. These couplings feature a backlash tolerance of 8′ of an arc. They can be used to couple different-sized shafts, ranging from 0.125-0.250 in. in diameter. All couplings are made from stainless steel. They're available from stock in more than 60 different clamp and solid-hub types. (Dynamic Gear Co., Inc.)

For more data circle No. 25 on postcard, p. 127

Engine Weighs 1000 lb; Produces 500-hp Output

Designed for industrial use, a multiple-fuel 500-hp turboshaft engine has a favorable weight-to-power ratio. It may be operated at either a fixed power-turbine speed or over variable speed ranges. The newcomer weighs less than one-tenth as much as a piston engine of similar power rating. Major engine components include: A gas generator; combustor and turbine; and an aft-mounted turbine that harnesses the energy in the gas generator's exhaust. The rear turbine also converts the energy from the gas generator into mechanical power. Then it transmits power to the output shaft through two gear-reduction steps. Mounted on a portable skid, the turboshaft engine can supply electrical power for drilling-rig setups. Other future uses center on continuous-duty generators and pipeline and compressor drives. (General Electric Co.)

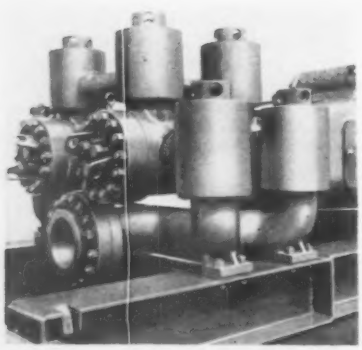
For more data circle No. 26 on postcard, p. 127



Check Valve Has Only Two Moving Parts

Sudden failure of a pipe, a tube or a gage that handles noxious, toxic, radioactive or flammable liquids or gases under pressure need no longer be a hazard. A new excess-flow check valve insures positive, automatic protection. With only two moving parts, this valve maintains —according to design option—either complete closure or a very slow calibrated leak. If a flow exceeds the preset rate, a spring-loaded poppet valve shuts instantly. After the down-stream rupture has been sealed and the system re-charged to normal pressure, the check valve resets itself. (Chemiquip Corp.)

For more data circle No. 27 on postcard, p. 127



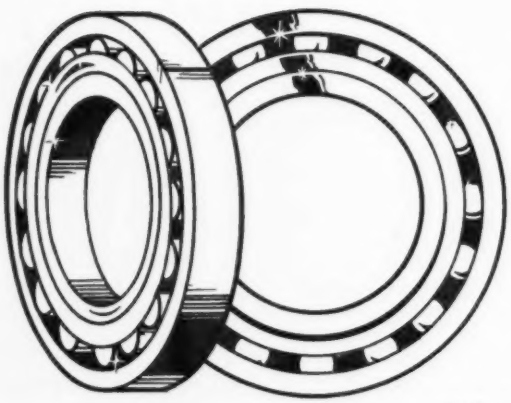
Steel Forgings Step Up Strength of Slush Pump

An improvement in a power slush pump hinges on forged-steel valve pots that are welded to forged-steel fluid-cylinder bodies. These subassemblies are then joined with a cast-steel discharge manifold. Automatic, submerged arc-welding equipment yields a homogeneous cylinder unit. The suction manifold, also a steel casting, is bolted to the weldment. All welds are stronger than the parent metal. Strict welding controls are maintained. Stresses are relieved after welding. Then every unit is hydrostatically tested at 8000 psi. Forgings in the fluid end of the 1250-hp (input) pump increases strength and soundness in areas that must withstand high stresses. (National Supply Div., Armco Steel Corp.)

For more data circle No. 28 on postcard, p. 127

NEWS!

KAYDON NOW REDUCES PRICES ANOTHER 25% TO 42% FOR "CP" BALL RADIAL BEARINGS AVAILABLE "OFF-THE-SHELF"



Low prices are also being quoted on many other ball and roller bearings ...both standard (4" bore and larger) and special (2" bore and larger).

You can now save on many of your current and future purchases of these bearings.

Send your inquiry now! Write, wire, or call Kaydon, Muskegon, Michigan. Phone: PLaza 5-3741.

K-619

20TH YEAR KAYDON PRECISION BEARINGS

THE KAYDON ENGINEERING CORP.
•MUSKEGON, MICHIGAN

All types of ball and roller bearings — 2" inside diameter to 178" outside diameter . . . Taper Roller Roller Thrust • Roller Radial • Needle Roller • Ball Radial • Ball Thrust • Four-Point Contact Bearings

BOSTON Gear® QUALITY

14½° stock gears 20°

Largest selection – off the shelf.

1781 types and sizes 14½° P.A. – 48 to 3 pitch.

782 types and sizes 20° P.A. – 120 to 4 pitch.

Spur, bevel, miter, worm, helical, spiral miter.

Brass, steel, iron, nonmetallic. See Catalog 57.

IN STOCK at your nearby DISTRIBUTOR

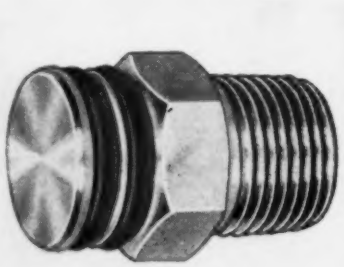
BOSTON Gear®

© Boston Gear Works, 1961
Quincy 71, Mass.

DESIGN DIGEST

Ban Dust From Exhaust

When an air line has a filter in it before leading into a pneumatic reciprocating vibrator or an air



valve, the only other place that dust, dirt and foreign items can enter is through the exhaust. And here's a new product that takes care of that loophole by protecting the exhaust ends of vibrators and valves. Standard series Dustproofers are made of aluminum. However, the units can be produced from other materials to meet environmental requirements. Dustproofers are simply screwed into the exhaust manifolds of vibrators or air valves. They're available in a wide range of sizes. (The Branford Co.)

For more data, circle No. 29 on postcard, p. 127

Gages Speed Changes

For measuring steady-state acceleration such as that of a missile during launch or re-entry, a new

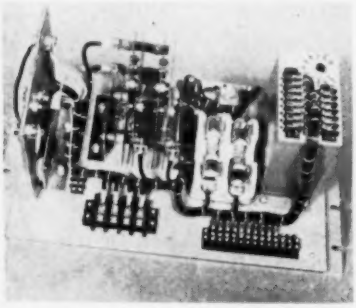
accelerometer switch provides reliable operation over a wide temperature range. The unit offers rapid

response time to steady-state accelerations, together with insensitivity to low-frequency vibration. This performance was achieved by building a high damping factor and a low natural frequency into the design. Reliable operation over a wide temperature range is ensured by the use of temperature-stable air dampers and flexure suspension. (Humphrey, Inc.)

For more data, circle No. 30 on postcard, p. 127

Reactor Replacement

Here's a line of replacements for saturable-core reactors used in electric furnace control. The new devices not only replace conventional saturable-core reactors but also the driver magnetic amplifier/preamplifier that controls the coil of the saturable-core reactor. Up to 90 pct savings in weight can be realized



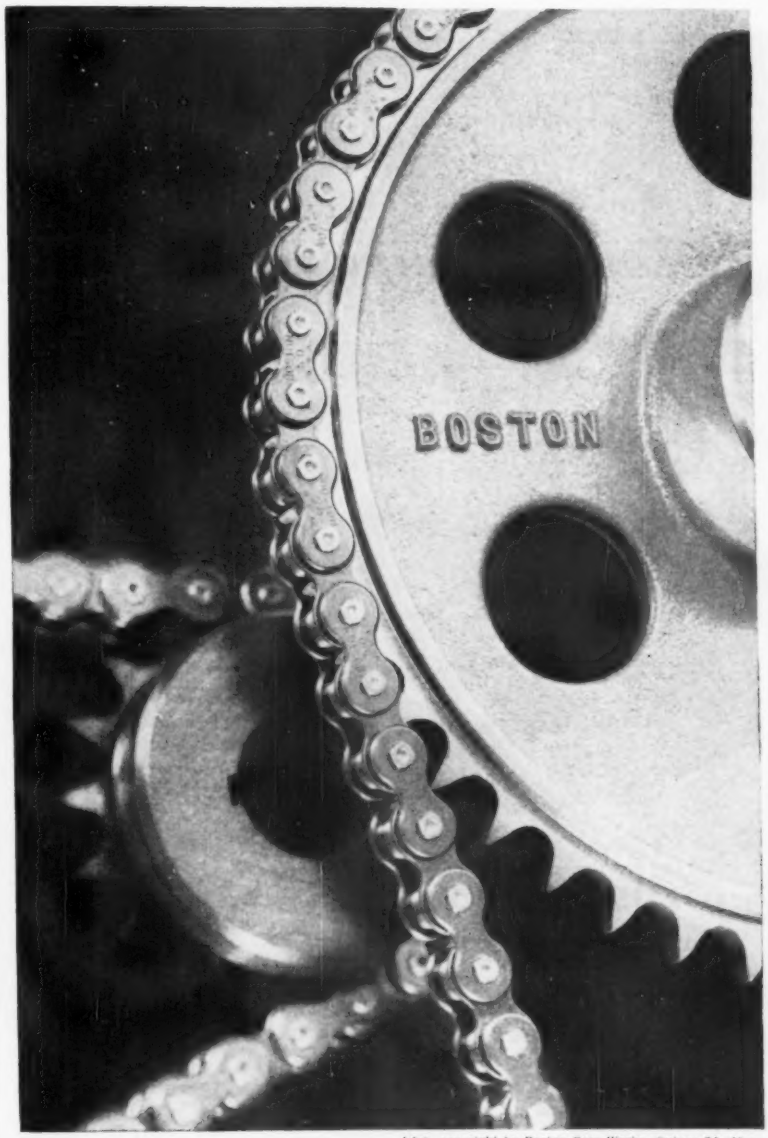
with the replacement sets. Power to 50-kva 3-phase, or 17 kva single-phase, is delivered to furnace loads from the network of silicon-controlled rectifiers in the replacement units. Output is directly proportional to input signal current. Seventeen separate assemblies comprise the line. Each unit can be universally used with existing standard electro-mechanical controllers. One significant advantage of the replacement device is the single-cycle response time. Another is the ability to apply one device to any furnace load within its power range, without matching the power ratings. (Norbatrol Electronics Corp.)

For more data circle No. 31 on postcard, p. 127

Hydraulic Pump

The unusual control versatility of a new hydraulic pump results from its balanced cylinder-block design

BOSTON Gear® QUALITY
sprockets and chain



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1488 types and sizes. From local stock.
Off the shelf - at factory prices.
For any chain drive 1 4″ to 2″ pitch -
Roller, Block, Ladder. See Catalog 57.
Design around the quality leader.

BOSTON Gear®
IN STOCK at your nearby DISTRIBUTOR

and wobble-type reaction plate. This almost eliminates pumping forces from the displacement-changing mechanism. Reaction pistons serve to balance the hydraulic forces exerted on the cylinder during pumping. Direct cylinder-block actuation at a low-force level accounts for fast response and stable control of pump output. A non-rotating cylinder block does away with centrifugal forces. The result is a real increase in maximum-speed potential. (The Weatherhead Co.)

For more data circle No. 32 on postcard, p. 127

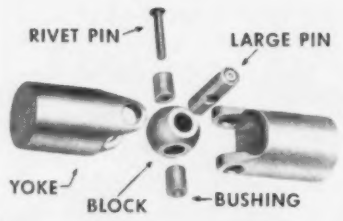
Locking Device

A positive-index locking device which has been used by the aircraft industry for precise linear and angular adjustment of control linkage and cylinder rod ends is now available to any industry with similar adjustment problems. This locking device consists of two investment-cast serrated washers, with each notch representing a 0.001-in. linear adjustment. To get the exact adjustment needed, a mechanic merely turns the device to the correct number of notches. There's no guesswork in measuring, adjusting, re-measuring, etc. Available sizes range from 0.26-in. ID and 0.44-in. OD to 2.265-in. ID and 2.88-in. OD (Arwood Corp.)

For more data circle No. 33 on postcard, p. 127

Universal Joints

Designed to provide high-horsepower capacity at speeds up to 1750 rpm, a new line of heavy-duty industrial universal joints are available either solid or bored. Even square holes can be provided. Bore sizes range from ⅜-3 in. Output ratings are from 0.41-150 hp at 100 rpm. Single joints insure smooth, sensitive operation through a full working angle of 40°. Double joints handle 80° working angles. For more information write on company letterhead to: Lovejoy Flexible Coupling Co., Chicago 44, Ill.



For more data circle No. 34 on postcard, p. 127

Wedge V-Belts

A 30 pct reduction in the size of the V-belt drive unit on a huge roll grinder, built by Farrel-Bir-

IMAGINE
A DISPLAY OF WASHERS
TWO MILES LONG!

If we were to lay out a display of *Milwaukee Wrot Washers* of every type, material, finish and purpose that we manufacture . . . standards and specials . . . it would stretch for a distance of about *two miles.*

We own, and have on hand for immediate use, over 129,000 sets of washer dies for producing a practically unlimited range of sizes, shapes and varieties. Our standard types in stock are so numerous that it's hard to stump us with any special order.

We invite every user of washers in the Metalworking Industry . . . ferrous, non-ferrous, stainless steel, plastic and fibrous materials . . . to call on us for its needs. Orders and quotations will receive expert and prompt attention.

PURCHASING PERSONNEL . . . Free samples available. Request on your letterhead, mentioning types of washers your company uses most frequently. Or write for Washers and Stampings Catalog 40-B.

MILWAUKEE WROT WASHERS
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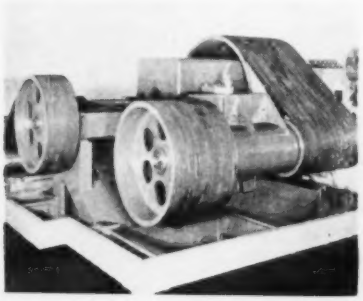
2110 SOUTH BAY STREET, MILWAUKEE 7, WIS.
SHeridan 4-0771 • twx MI 277
WORLD'S LARGEST PRODUCER OF WASHERS

mingham Company, Inc., has been accomplished by cutting the "fat" out of standard V-belt sections. The savings in drive size was effected through use of "wedge" belts in 5V and 8V sizes rather than standard D- and E-section belting. This huge grinder is the largest ever installed in the country. It's capable of handling rolls up to 200 tons, 81 in. in diameter and 40 ft in length The V-belt drive acts as a speed reducer as well as a means of transmitting power. By using wedge belts, total face width of drive sheaves was reduced from 141 in., with standard section belts, to only 97 in. with



the narrower, more compact wedge design. The final drive requires 91 belts in four flights to reduce the motor speed of 300 rpm to a grinding-face speed of 5 rpm. The first flight carries 12 matched belts of 5V section from the motor sheave to the first reduction unit. The second flight carries power with 13 8V belts, transferring to 26 8V belts in the third flight. The final reduction includes 40 8V belts to maintain full power to the machining operation without belt slip or loss of smooth control. (The Goodyear Tire & Rubber Co.)

For more data circle No. 35 on postcard, p. 127

Air Coupling

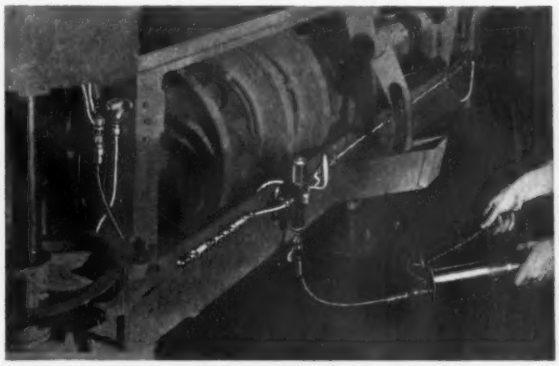
Here's a new air coupling with self-contained air cylinders, for the designer of chucking equipment. Inserting air through the cylinder walls actuates the chuck. This unusual design lets you keep the center of the chuck open for through feeding of bar stock. To operate the unit, the air is turned on after the work spindle has stopped. When the chuck is loaded with air, the work spindle can be started again and run at any desired speed. Also, when the chuck is running, there's no friction. This is so because clearance is established when the coupling is set up to run. It's an ideal condition for high-speed jobs. (The N. A. Woodworth Co.)

For more data circle No. 36 on postcard, p. 127

Glass Pump

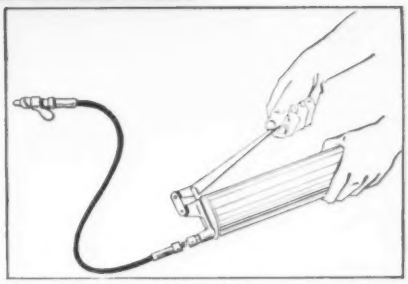
For those highly-corrosive pumping jobs involving relatively-small capacities—up to 75 gpm—a new 1-in. glassed pump is now available. This unit will fill a demand in the chemical-processing industries for a lower-capacity pump. Glass is fused to metal on all surfaces coming in contact with the pumpage. This provides almost universal resistance to corrosion. It also eliminates contamination of the product and adherence of product to pump parts. The bonded glass is tough and all glass surfaces are continuous. Also, a confined Teflon envelope gasket

NON-FLUID OIL
TRADE MARK REGISTERED



Ordinary Grease Clogs Lines, Valves and Fittings

NON-FLUID OIL is Dependable and Long-Lasting



NON-FLUID OIL is the ideal pressure system lubricant because it is dependable, long-lasting and economical. Ordinary grease separates under pressure, forming residue that clogs valves, lines and fittings. NON-FLUID OIL lubricates effectively until entirely consumed . . . pumping pressures do not alter its original consistency, so each bearing is assured of adequate lubrication. This makes it more economical to use. Time cycles are extended, pressure lowered, or amounts fed to individual bearings are reduced. You get better plant housekeeping and reduce fire hazard.

Write today for a free testing sample of NON-FLUID OIL and Bulletin 552.

1896 65 YEARS 1961 — SIXTY FIVE YEARS OF LUBRICATION SERVICE TO INDUSTRY — NON-FLUID OIL

NEW YORK & NEW JERSEY LUBRICANT COMPANY
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NON-FLUID OIL is not the name of a general class of lubricants but is a specific product of our manufacture. So-called grease imitations of NON-FLUID OIL often prove dangerous and costly.

CLEANING *Specialists* FOR AMERICAN INDUSTRY

MISSILE CLEANING TOWERS AT DOUGLAS AIRCRAFT'S SANTA MONICA PLANT.

FULL-FLEDGED PARTNERS IN AMERICA'S VITAL AEROSPACE PROGRAM

Detrex know-how and superbly designed products are being supplied to the Aerospace Industry in constantly increasing amounts.

Practically every major industry in the country has benefited from the marked superiority of Detrex chemicals, equipment and service.

Here is a combination of facilities and services unequalled in its field.

There is only one Detrex—a single, quality source for all your metal cleaning requirements.

Write today for detailed information on our products or services.

Perm-A-Clor NA (trichlorethylene)
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Rust-Proofing Materials
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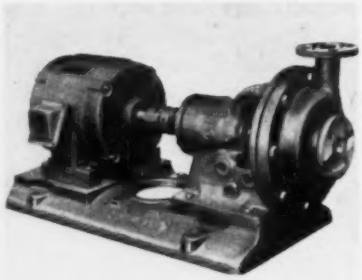
Phosphate Coating Compounds
Paintbond Compounds
Extrusion and Drawing Compounds
Spray Booth Compounds
Industrial Washers

DETREX CHEMICAL INDUSTRIES, INC.
BOX 501, DEPT. IA-1161, DETROIT 32, MICH.

DESIGN DIGEST

between casing and casing cover provides a corrosion-proof and leak-proof joint. With the quench gland and bearing cooling chamber, liquids

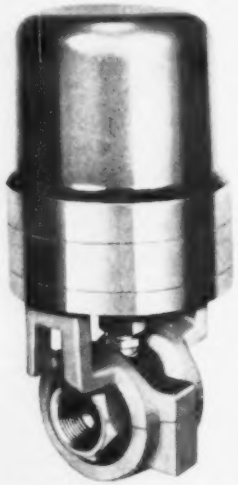


up to 350°F can be handled. Grease-lubricated ball bearings are standard, with oil-lubricated bearing construction optional. The pump's fully-open type impeller is specially designed for glassing. It has an extended hub which fully protects the stainless-steel shaft from the pumpage. This hub extends beyond stuffing box gland to eliminate any joint within the pump —always a possible source of leakage along the shaft. (Goulds Pumps, Inc.)

For more data circle No. 37 on postcard, p. 127

On-Off Control

Available with air and electric actuators, ball valves serve in auto-



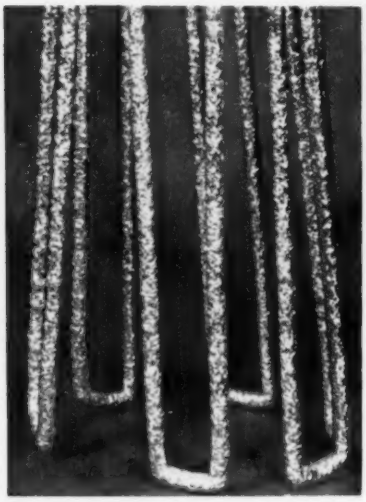
matic and remote on-off flow-control setups. Both types of actuators are sold integrally with each valve or separately for valves already in

service. The pneumatic actuators are available in three sizes, from ¼-2 in. They mount directly on the valve to simplify alignment and reduce space requirements. The electrical actuators are weatherproof. They feature stainless-steel output shafts and aluminum housings with hardened-steel gear teeth. Cycle times as short as 5 seconds from full-open to full-closed are possible, depending on valve size. (Hills-McCanna Co.)

For more data circle No. 38 on postcard, p. 127

Hafnium Crystal

Ultrapure hafnium-crystal bars are now commercially available.



Engineers have developed production methods which allow the growth of hafnium-crystal bars weighing more than 200 lb. "These techniques," according to Dr. Z. Shapiro, president of Nuclear Materials and Equipment Corp., "can be adapted for economic production of other ultrapure metals such as titanium, zirconium, columbium, chromium and silicon."

For more data circle No. 39 on postcard, p. 127

Unusual Casting

Tiny, precise die cast and molded parts are the key to low-cost production of a miniature 1/1000-hp electric motor. This unit offered a technical challenge in that it requires many small parts of intricate shape which must be mass produced to close dimensional tolerances at economical cost. The following ex-

BETHLEHEM STEEL COMPANY PHOTO

This Olsen's at home

around hard hats or white coats!

Here's a testing machine just as reliable in the shop as in the R/D lab. At the Sparrows Point Plant of Bethlehem Steel Company, this Tinius Olsen Super "L" is proving its worth every day.

It's designed to make wire testing easier, faster. Crossheads are low centered, grip fronts open. Automatic control "dumps" the load as soon as the specimen fractures. These features, plus split cabinet design and precise load indication provide unbeatable testing speed and convenience.

Learn how the Super "L" will pay dividends in your production or R/D testing program. Write today for Bulletin 47-W. Tinius Olsen Testing Machine Company.

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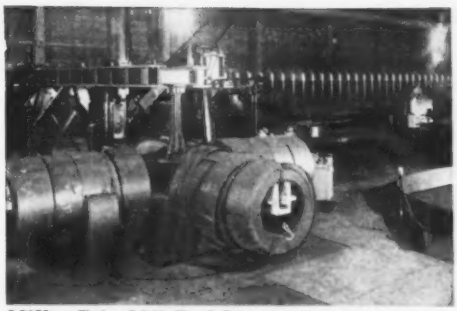
2120 Easton Rd.
Willow Grove, Pa.

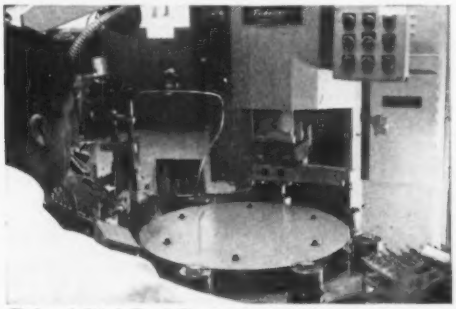
Warco
PRESS
400-2-60

◀ ***Warco Press Line*** composed of three 400-ton straight side, eccentric gear presses forms automobile wheel "spiders" at The Budd Company's Detroit plant. Here, William F. Longfield, manager of press engineering and sales for McKay's Federal-Warco Division, looks over a finished wheel with Edwin Seiberlich, works manager, and R. O. Greenshields, plant manager.

Photo by ARNOLD NEWMAN



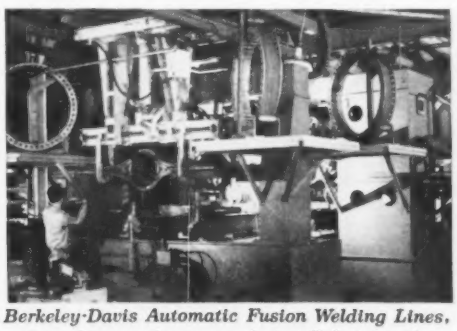
McKay Tube Mill Feed Line sends steel to the tube mill continuously at a rate of 1,800 fpm at U. S. Steel's National Tube plant at Lorain, Ohio.



Federal Dial Feed Projection Welder, one of several used by the Bendix Corporation to weld transistor assemblies. It will weld 2,000 assemblies per hour with exacting precision.

Uncoiling, flexing, processing, slitting, shearing, feeding, forming, stamping, and welding . . . keeping ***metal in motion*** in the most economical manner possible, from coil to finished product, ***is the business of McKay Machine.***

McKay Machine, its divisions and subsidiaries produce the widest range of metal preparation, processing, forming and welding equipment available anywhere. Because of this they can design and build complete, integrated production lines of perfectly mated machinery. This makes it possible to achieve compactness and bring about efficiencies not otherwise practical. It also means the manufacturer is concerned with only a single source of responsibility and supply. That's why more and more cost-conscious metalworking firms are making it a point to know *The McKay Machine Company, Youngstown 1, Ohio.*



Berkeley-Davis Automatic Fusion Welding Lines, such as this one of two recently installed at American Metal Products Company in Detroit for the automatic production of over 200 sizes of motor vehicle axle housings, lead the industry in precision operation, production efficiency, and flexibility.

CASH IN YOUR CHIPS

Change Metal Turnings Waste into More Profitable Shoveling CHIPS

American METAL TURNINGS CRUSHERS

No progressive, profit-conscious company—who produces 10 or more tons of metal turnings per month—can afford to ignore the profit potential of a modern chip salvage system . . . with an American Metal Turnings Crusher at the core.

American installation profits include: $4 more per ton for chips than for machine turnings; up to 50 gallons per ton in cutting oil recovery; 75% less storage; easier, faster handling.

How many profit dollars are you losing under present operations? If, for example, you're currently producing 20 tons of turnings a month . . .

THIS COULD BE YOUR PROFIT STORY FOR NEXT YEAR!

240 Tons Metal Turnings per Year (20 tons/month at $4 extra per ton)	$ 960.00
6,000 Gallons Recovered Cutting Oil at 30¢/Gal. (50 gals. per ton x 240 tons = 12,000 gals. Half of this, 6,000 gals., can be credited to use of chips instead of turnings in reclamation)	$1,800.00
Estimated Savings in Manpower, Storage, Tools, Maintenance, Freight, etc.	$ 300.00
TOTAL GROSS PROFIT	$3,060.00

WRITE for Metal Turnings Crusher Bulletin.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND AVE. • ST. LOUIS 10, MO.

DESIGN DIGEST

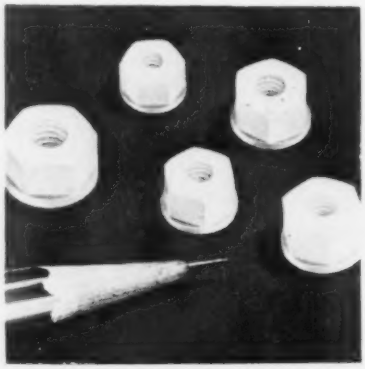
ample indicates how well this challenge was met: To insure firm anchoring of the armature and a

fixed relationship to the make-and-break cam, designers called for the cam and armature drive pinion, along with the journal trunnions, to be integral with the magnet holder. These three "separate" components were die cast as a one piece unit, eliminating assembly cost and any possibility of improper alignment. In addition, the necessary close tolerances on the cam and pinion teeth were maintained, and the entire unit used as-cast. The motor was designed by the Display Motor Div. of Hankscraft Co. Gries Reproducer Corp. supplies the castings.

For more data circle No. 40 on postcard, p. 127

Nylon Lock Nuts

A list of specialized fasteners supplied on short notice and in



small quantities now includes molded-nylon lock nuts, in addition to a variety of molded-nylon machine screws, nuts, washers, and screw in-

sulators. By providing the fasteners in packages of 10 and 100 units, this specialized service saves time and money, eliminates waste of unused parts when research and development, repair, and general lab and plant uses call for as few as 10 nylon lock nuts of a specific size. Because of their unusual vibration resistant, self-locking, and self-sealing design, the nylon nuts are ideal for sealing off commercial liquids and gases. The nut automatically aligns the screw in the hole, holds it tightly at center, and prevents wobble, chatter, and longitudinal movement. (Machine Parts Supply Co.)

For more data circle No. 41 on postcard, p. 127

Air-Control Device

Made completely of anodized aluminum, an air-control device conditions the air used in pneumatic

tools, air gages and other air-actuated equipment. It contains an automatic moisture-ejection filter, a piston-type self-relieving regulator and a mist-type lubricator. (Airmatic Valve, Inc.)

For more data circle No. 42 on postcard, p. 127

Pure Cobalt Strip

According to the manufacturer, pure cobalt coiled strip with good ductility is now commercially available for the first time. The strip comes in thicknesses ranging from 0.005-0.025 in., and in widths of ¼-6 in. Up till now, pure cobalt metal in strip form has not been commercially available because it was said to lack the ductility and workability essential in metalworking operations. Its important elec-

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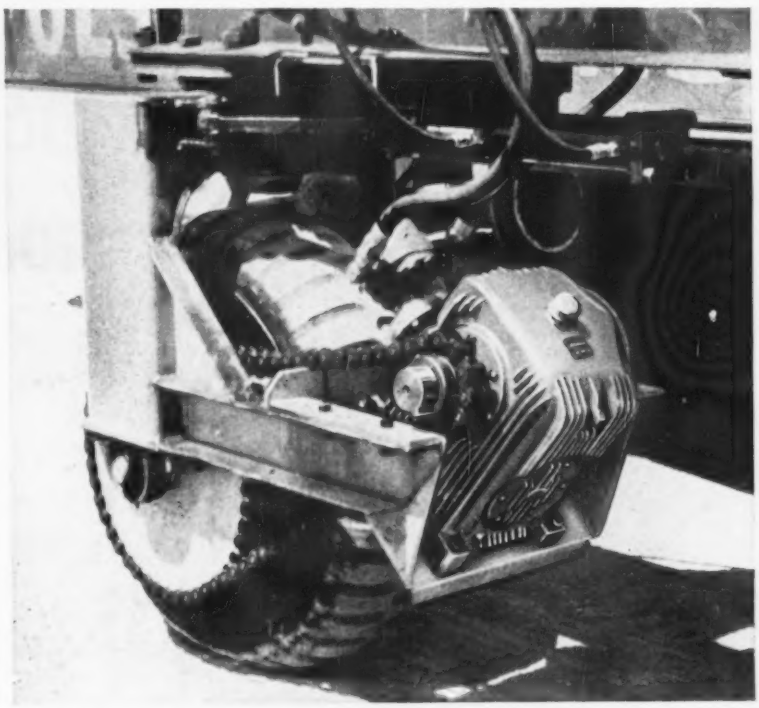


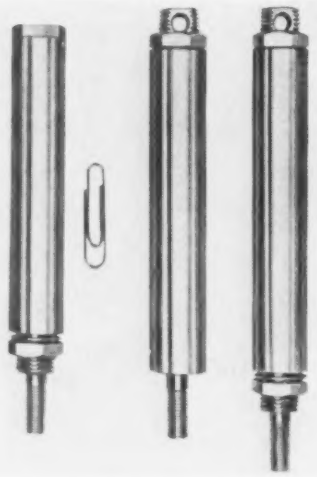
STURGEON BAY, Wisc. Manufacturer solves drive problem for traveling crane by mounting hydraulic motor-driven speed reducer at wheel. Double-enveloping worm gear design permits compact unit necessary for application. Available from Cone-Drive Gears, Div. Michigan Tool Co., 7171 E. McNichols Road, Detroit 12, Michigan.

trical and mechanical properties and corrosion resistance were chiefly used in alloying. However, this new strip preserves these properties and extends cobalt's metalworking uses to a much wider range of products. Key to the strip's improved properties lies in the purity of the powder from which it's rolled; and in a new powder-rolling process. (Sherritt Gordan Mines Ltd.)

For more data circle No. 43 on postcard, p. 127

Heavy-Duty Cylinders

Designed for working ranges up to 250 psi air, and up to 2000 psi hydraulic, new double-acting and spring-return cylinders come in stud, clevis and universal mounting styles. The double-acting models are furnished in six strokes, 1-6 in. Single-acting (spring-return) units have 1-, 2- and 3-in. strokes. Cylinder tubes are machined from heavy-wall hard drawn brass, and are "ballized" internally for uniform fine finish. Pistons are brass, threaded and secured to the shaft. T-rings



with back-up washers supply the piston seal. (Clippard Instrument Laboratory, Inc.)

For more data circle No. 44 on postcard, p. 127

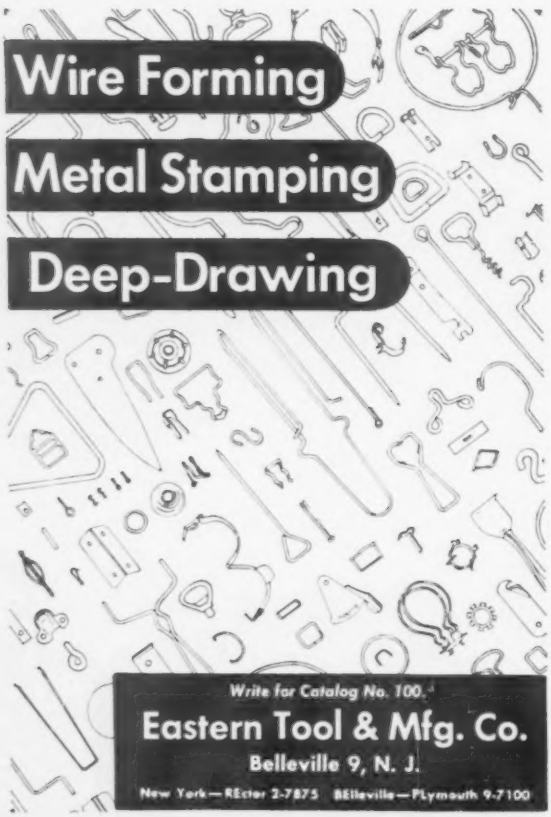
Tough Nut to Crack

Development work on the use of beryllium copper for heavy, semi-finished hex-machined nuts indicates that this material is ideally suited for applications where the load factors exceed the limits of present materials. Some striking test results from Beryllium Corp. back up this contention. For example, with ⅝-in. beryllium-copper hex nuts, maximum stripping load occurs at 65,000-75,000 lb, using bolts made of "Vasco-Jet" alloy. There should be a bright future for these "tough-to-crack" nuts wherever high strength, corrosion resistance and good conductivity are vital.

For more data circle No. 45 on postcard, p. 127

Sintered Copper

Here's a new powder-metallurgy process that presses and sinters copper, cutting the cost of electrical-grade copper parts by an average 10 pct compared to extrusions or forgings. Electrical conductivity of the sintered copper parts is 93 pct that of wrought copper. Hardness is 80 Rf compared to 87 Rf for hard wrought copper. Tensile strength equals 39,000 psi, compared to 45,-



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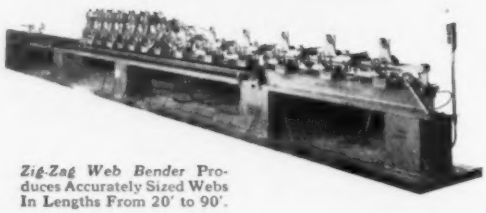

Zig-Zag Web Bender Produces Accurately Sized Webs In Lengths From 20' to 90'.

The Zig-Zag Web Bender obsoletes every other method of producing webs for joists by bending webbing faster and with greater accuracy.
One or two men can operate the Zig-Zag Web Bender and produce several times the output possible with old fashioned bending.
Depth, pitch and radius of bends are precise and consistent in their precision in every bend, resulting in fewer slow-ups on the welding line.
For complete technical details on the Zig-Zag Web Bender write to:

*10' Long—16" High—12" Pitch

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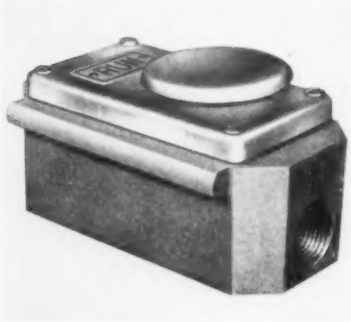
000 psi for hard wrought copper and 33,000 psi for soft wrought copper. Yield strength is 36,000 psi

compared to 40,000 psi for hard wrought copper. While typical savings of 10 pct reflect pilot-run results, actual savings depend on the amount of machining, material and labor in the comparable extruded or forged part. Length of run also has an effect on savings. (Fansteel Metallurgical Corp.)

For more data circle No. 46 on postcard, p. 127

Easy-to-Push Buttons

With flush-mounted push buttons, a new finger-grip oil-tight case proves helpful in reducing operator fatigue whenever frequent, continuous operation is a must. Each cast-



aluminum case has a ½-in. finger grip on one edge. This provides leverage for the operator. (Clark Controller Co.)

For more data circle No. 47 on postcard, p. 127

Insulated Wire

New manufacturing advances make it possible to produce longer lengths of insulated wire to closer electrical and physical tolerances

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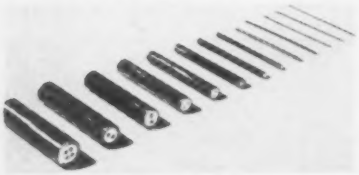
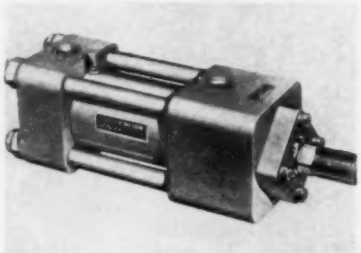


insulation voids are things of the past. As a result of these new manufacturing methods, special assemblies—such as tri-axial and bi-axial thermocouples are now possible. (Aero Research Instrument Co.)

For more data circle No. 48 on postcard, p. 127

Hydraulic Cylinders

Three basic lines of hydraulic cylinders will soon be on the market. Offerings include: 2000 psi units, for use in machine tools; 2000-3000 psi "all-purpose" units, meeting JIC specifications; and heavy-duty 5000 psi units, specifically designed to work with existing 5000 psi pumps and fluid motors. Bore sizes will range from 1⅛-14

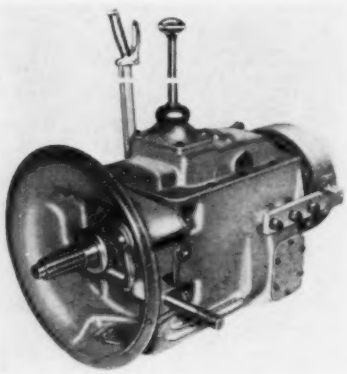


in., with 17 different mountings available. (Denison Engineering Div., American Brake Shoe Co.)

For more data circle No. 49 on postcard, p. 127

Truck Transmission

This new five-speed, heavy-duty truck transmission features an unusual pressure-lubrication system that insures long service life. Positive lubrication of the top or main shaft of the transmission is provided by the pressure system. This is particularly desirable in long-haul trucking operations which require extended periods of high-gear driving at high engine speeds. The lubrication system consists of a single pump which does not have gears, springs or valves—the usual pump elements that wear. Instead, it has only three elements: A rotor which surrounds and is driven by the input shaft; a single free-floating vane confined in the rotor; and a sta-

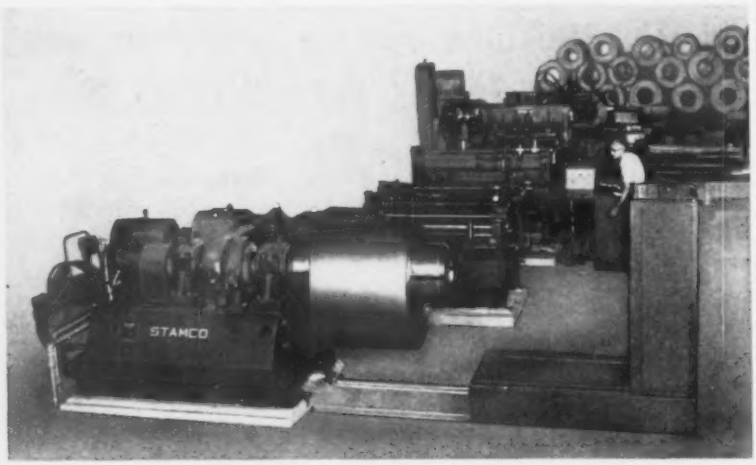


tionary housing. Available in six models, the transmission is designed for use with Diesel or gasoline engines with about 400-550 ft-lb of torque. (Clark Equipment Co.)

For more data circle No. 50 on postcard, p. 127

Stamco equipment

handles coils up to 72 inches wide ... reduces operating costs



Designed and built for greater capacities, this new Stamco shear line will accommodate stock up to 14 gauge, in widths to 72 inches. It handles coils weighing a maximum of 20,000 pounds. Accuracy can be held to plus or minus 1/32 inch. Lengths can be cut from 14 inches minimum to any maximum length.

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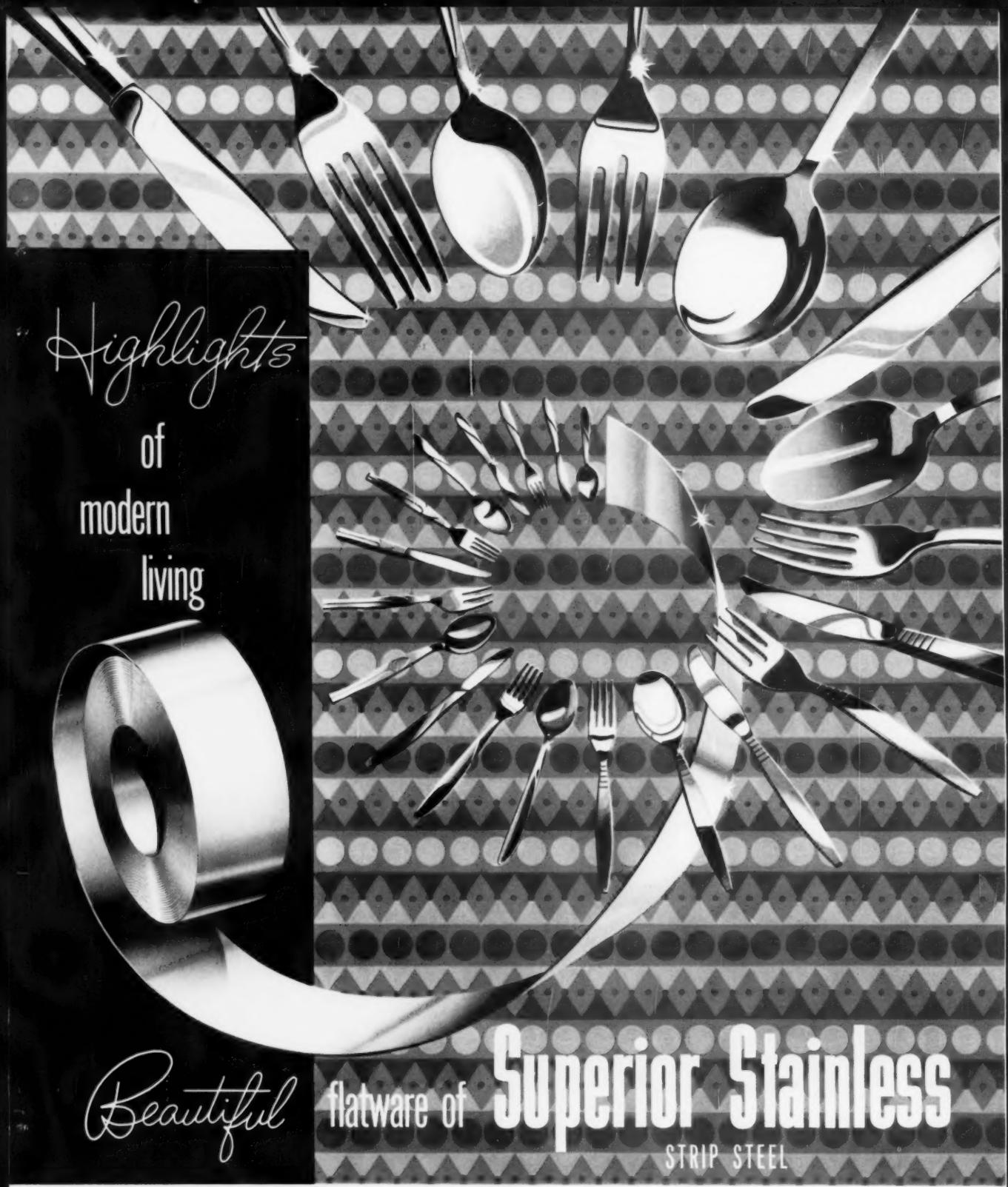

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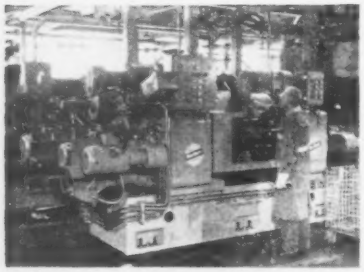
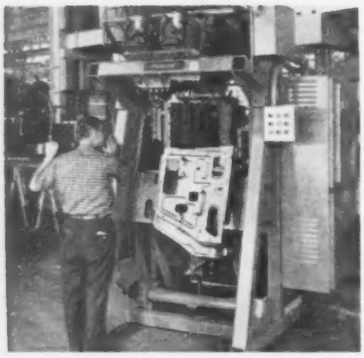
New Equipment and Machinery



Index Machine Features Variable Speeds and Feeds

Versatile is the word for a new horizontal trunnion-type index machine. In the past, these units got along with uniform spindle speeds at all stations. With this new machine, each control station performs its own set of functions; and each boasts individual control of feeds and speeds. Hydraulic, quill-feed head units mount at each station where they're used for either single or multiple spindle operation. There's also been provision made for the addition of milling heads. (Daris & Thompson Co.)

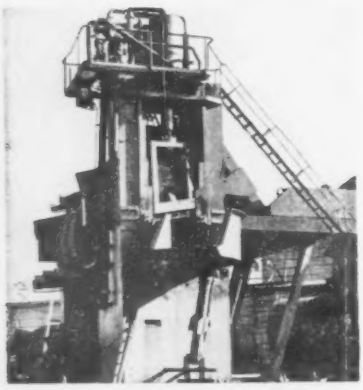
For more data circle No. 65 on postcard, p. 127



Production Welder Speeds Auto Door Assembly

At a rate of 120 or more per hour, this special machine spot welds two hinge reinforcements and an extension part to the inner panel of an automobile door. To achieve this production-line speed, the unit teams up 32 hydraulically-operated, spot-welding guns. Power for the battery of welding guns comes from nine, packaged-type, 50-kva welding transformers. First, the operator loads the parts onto the lower die. He then places the inner door panel in position. Locators hold the pieces and insure proper alignment. From here on in, all the operator has to do is push the start button. The machine takes over and performs all welding operations automatically. (McKay Machine Co., Federal-Warco Div.)

For more data circle No. 66 on postcard, p. 127



Huge Shear Handles 30 Tons of Scrap Every Hour

Here's a giant hydraulic shear that handles 30 tons of scrap per hour with a cutting and crushing force of up to 12 tons. Equipped with automatic controls for continuous operation, the shear is crane fed with scrap pieces as large as a complete quarter section of a railroad gondola car. These and other bulky steel-scrap items are readily processed to preselected lengths by the shear's action. Formerly, acetylene torch cutting was the only method available for dealing with this type of scrap. One key feature of the shear is its patented charging box. The box takes a 1-in. thick steel plate 30-ft long and up to 12-ft wide, and compresses it down to a 3-ft width before passing the scrap under the guillotine-type cutting head of the new hydraulic shear. (Harris Foundry & Machine Co.)

For more data circle No. 67 on postcard, p. 127

Steel-Cutting Band Saws Get Servo Control

Latest innovation in the use of new high-speed automatic band saws involves an unusual servo mechanism. This unit controls sawblade movement and literally "steers" the blade through intricate cuts in even the toughest steels. In fact, with the servo in control, these new saws hold tolerances to ± 0.005 in. And they can cut angles or miters at any setting up to 45°—right or left of vertical. According to the user, this new equipment answers the need for obtaining greater accuracy and longer useful life from high speed steel band blades. Accuracy is derived from two carbide-tipped contact points in the sensing element which mounts on the upper guide head. These contacts detect any lateral departure of the blade from a straight line during the cutting operation. (Morrison Steel Co.)

For more data circle No. 68 on postcard, p. 127

Vibration Polishing

High-efficiency deburring and polishing of metal, plastic and ceramic parts is the forte of a new line of high-frequency, low-amplitude vi-

bration mills. More recently, the technique has been applied to particle size reduction, by wet grinding or dispersion to sub-micron size, for a wide range of chemicals, minerals and clays. The new finishing process gives a three-dimensional vibratory motion to the special types of media and compounds used, and to the parts themselves. In addition to the vibrating and sliding action associated with barrel finishing, there is a spiral, orbital movement of the parts through the media. (Southwestern Engineering Co.)

For more data circle No. 69 on postcard, p. 127

New Tumbling Media

Newly developed is an unusual tumbling media of steel-wool fibers formed into shapes with a resin binder. These tumbling shapes play

a dual role. Depending upon the type of material being worked, the steel-wool shapes produce fine satin or matte surface finishes with luster and high color. Another important feature is their ability to remove tiny burrs from delicate screw-machine products and similar parts. The shapes remove burrs which

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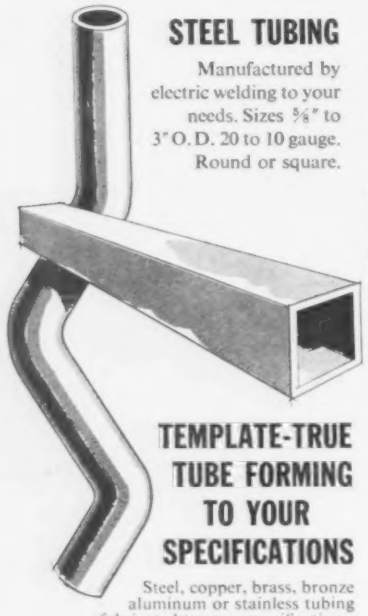

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NEW EQUIPMENT

may not exceed 0.002 in., yet they will not remove stock. No compounds of any kind are added in the dry process. Wet tumbling can be done with the media, but working dry has proved most efficient. This is certainly a singular feature. (Antro Abrasives, Inc.)

For more data circle No. 70 on postcard, p. 127

Lightweight Tools

In the first major move to provide "space-age" metals for the hand-tool field, Proto Tool Co. announces a line of lightweight, high-strength hand tools made of an advanced heat-treated alloy of aluminum. First in the line are two ratchet wrenches of a new design. It's claimed that these wrenches weigh 43 pct less than steel wrenches,

equal the strength of steel wrenches and exceed Federal torque-performance specs for steel ratchet wrenches. The new ¾-in. square-drive ratchet is 19¾-in. long, weighs just 3½ lb, and is rated for 1600 ft-lb torque. The 1-in. square drive ratchet is 25½-in. long, weighs only 7¼ lb and turns 3000 ft-lb torque. Big advantage of the tools should lie in lessening muscle fatigue on long jobs, especially on jobs requiring the operator to be in difficult, tiring positions. The light weight is also an advantage in carrying the tools to and from the job, especially where climbing is required. The wrenches are forged from aluminum alloy 2014, a type widely used in aircraft and missile components for its combination of low weight, high strength and durability. After forging, the tools are heat treated to T-6 temper to derive optimum physical properties of the metal. (Proto Tool Co.)

For more data circle No. 71 on postcard, p. 127

Diffusion Furnaces

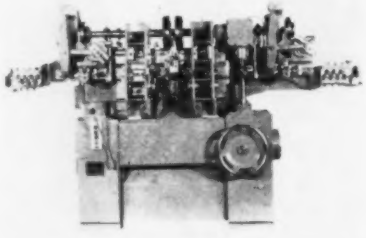
Each of four gaseous diffusion furnaces, recently delivered to a major semiconductor manufacturer,

consists of four diffusion units mounted on a single control cubicle. The diffusion units have 2-in. ID x 26-in. long tubes surrounded by zirconia muffles. Engineered elements, monitored by stepless null-balance controls, provide the extreme temperature uniformity demanded by the process. The furnaces effectively dampen temperature "ripples" and provide an optimum flat zone. Each of the diffusion units has its own separate instruments and controls. Temperature settings are thus established independently for each diffusion unit. (C. I. Hayes, Inc.)

For more data circle No. 72 on postcard, p. 127

Forms Metal Parts

This new double-feed metal-processing machine can separately die-stamp and form two wire or



strip pieces and then assemble them. Output rates range up to 200 assemblies per minute. Material capacity of the newcomer is 2½-in. maximum strip width, 0.062-in.

maximum strip thickness and 0.207-in. maximum wire diameter. Top feed length is 12 in., with either 90° or 180° feed cycles. Maximum press capacity is 36 tons (12 tons per press), with two presses on the left-hand side and one on the right. (The Torrington Mfg. Co.)

For more data circle No. 73 on postcard, p. 127

Welding Family

A complete family of semi-automatic welding equipment includes a new 250-amp constant-potential power source, two new wire-drive options, and three new gun assemblies. In various combinations, the new and established equipment can be matched to perform all light- and heavy-gage semi-automatic welding jobs on a complete variety of materials. Most significant addition is the 250-amp power source. It's geared for light-gage welding with the gas-shielded processes. This unit combines the conductivity and unchanging arc characteristics of full-wave silicon rectification with the inherently good voltage regulation of the constant-potential process. Output ranges from a minimum of 10v to a maximum of 40v, covering

all light-gage welding applications. A 110-v ac accessory power supply is built into the unit. Silicon rectifiers and the transformer are kept within safe temperatures — even when operated at full amperage—by a two-way thermal and overload

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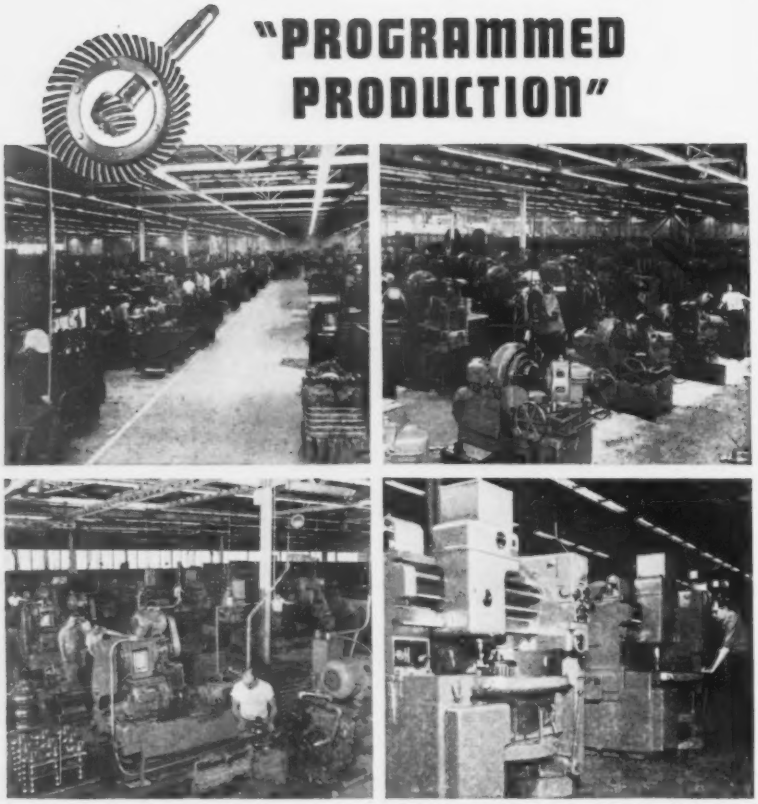

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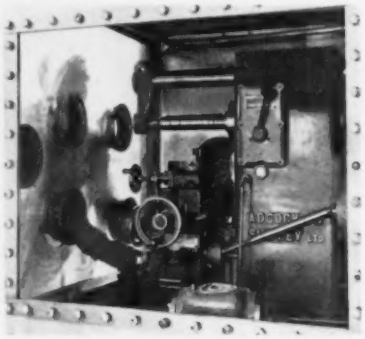
MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS

protector. An adjustable slope control yields the exact welding characteristic desired for any light-gage use. The unit also incorporates a built-in reactor, a "ready-to-weld" pilot light which glows when primary power is on, and a voltage test switch which guarantees instant arc striking. The machine rates at 200 amp on a 100 pct duty cycle, and at 250 amp on a 60 pct duty cycle. (A. O. Smith Corp., Welding Products Div.)

For more data circle No. 74 on postcard, p. 127

Mills "Hot" Metals

In an unusual application, a standard-model milling machine serves with safety in the machining



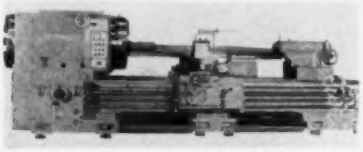
of radioactive metals in Great Britain. Key to the application is a special glove box which isolates the operator from the machine. At no time does he come in contact with the machine, swarf or job. To overcome the difficulty of speed changing, the normal method of moving belts over stepped pulleys is replaced by a Kopp Variator. This unit, and the 3-hp electric motor which drives it, are outside of the glove box. The drive to the milling machine is taken through a long shaft with a running seal. This shaft is super-finished to a high degree of surface finish in order to avoid wear on the seal. The shaft extends into the base, where suitable bearings are provided for it. In the base it carries a six-groove pulley driving through six belts to a pulley mounted on the spindle. In order to make it easy to operate through the gloves, hand wheels instead of ball handles are fitted to the milling ma-

chine. Also, the controls which operate the knee and cross slide are reversed. (Adcock & Shipley Ltd.)

For more data circle No. 75 on postcard, p. 127

Heavy-Duty Lathes

A complete line of heavy-duty lathes handle automatic threading, turning, tracing and tapering, in

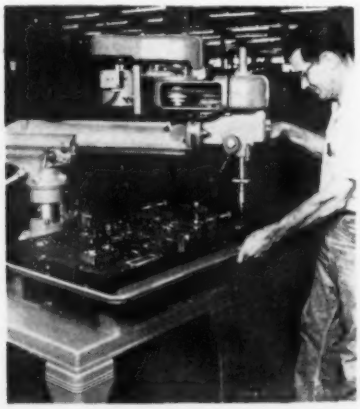


addition to normal lathe work. They're available with front and rear air, or with hydraulic chucks. Swing over the carriage is 28 in.; with 42½-in. swing over the bed. Four Timken bearings support the heavy-duty spindle. Hardened and ground gears are used throughout the lathe's unusually rugged headstock. There are 24 speeds ranging from 2-500 rpm. Any length beds are available with hardened replaceable inserts in the ways as standard equipment. Many other features such as helical back gear, forced lubrication and rapid power traverse are also standard. (S & S Machinery Co.)

For more data circle No. 76 on postcard, p. 127

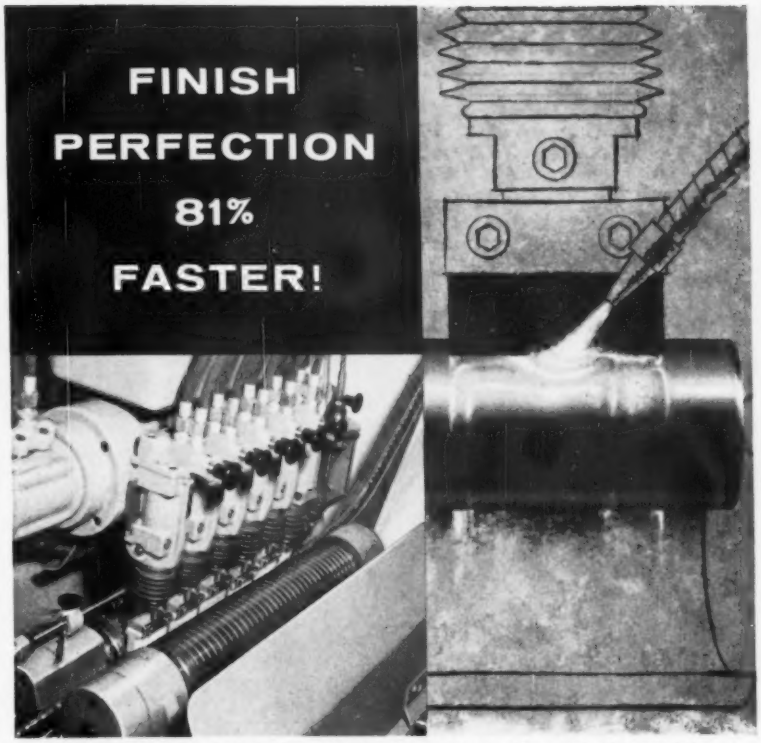
Radial Drill Presses

According to the manufacturer, new ram-type radial drill presses match the ruggedness, versatility



and general performance of heavy machine tools costing several times as much. These newcomers cut production costs and simplify production operations, by making it unnecessary to move jigs and other

FINISH PERFECTION 81% FASTER!



Model 88 Through-Feed Centerless Microstoning Machine for automatic production and Microstoning head of the Model 9681 Microstoner, for attachment to lathes and other machine tools.

Microstoning Produces Controlled Microinch Surfaces Fast, Precisely, Profitably

Remarkable but true . . . operations are eliminated with Microstoning. You get results at least equal to — but usually much better than — you get with costly, time-consuming precision machining, grinding and handwork. And you get these results in the shortest possible time: One company cut finishing time from 30 hours to 4 hours, another from 30 seconds to 5 seconds!

Microstoning is the exclusive Taft-Peirce/Supfina process in which special Microstones in a wide range of grits and bonds oscillate pneumatically against work pieces. Because microstones take the shape of the work and oscillate at a natural frequency, microstoning corrects out-of-roundness and gives you controlled microinch surfaces — even fractional microinch if specified — in one quick cycle.

Ask your Taft-Peirce agent to demonstrate how you can *improve quality* while *reducing costs* with Taft-Peirce/Supfina. Or write for detailed information.

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NEW EQUIPMENT

mounting fixtures. Because the spindle can be moved to the work, the tool provides unusual versatility. The drill press head moves in and out through an 18-in. travel radius on a smooth traveling ram that permits drilling to the center of a 62-in. circle. Eight models are available with either 4¼-in. or 6-in. spindle travel and "standard" 30-in. or "long" 42-in. column length. (Rockwell Mfg. Co., Power Tool Div.)

For more data circle No. 77 on postcard, p. 127

Abrasive-Belt Grinder

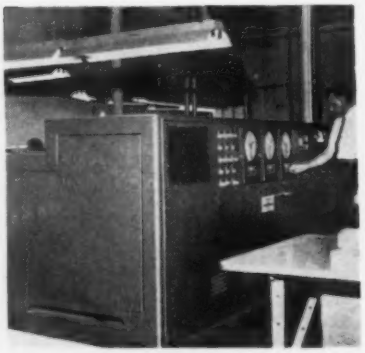
This new abrasive-belt finishing machine performs flat grinding, deburring an polishing operations on

such parts as bars, strips, blanks, stampings, forgings, die castings and sand castings. Plastic, ceramic, wood and rubber parts can also be finished on this compact machine. In operation, a motorized conveyor belt carries the work under spring-loaded hold-down rollers and the abrasive-belt contact wheel. If desired, multiple head assemblies can be mounted in tandem along one long conveyor belt to perform high-production progressive finishing operations. These heads can also be mounted on a bench or used in conjunction with rotary tables. (Acme Mfg. Co.)

For more data circle No. 78 on postcard, p. 127

Automated Furnace

For the first time, vacuum processing has been put on a fully-automated, continuous basis with the start up and successful operation of a new vacuum conveyor furnace at the Newark plant of General Instru-

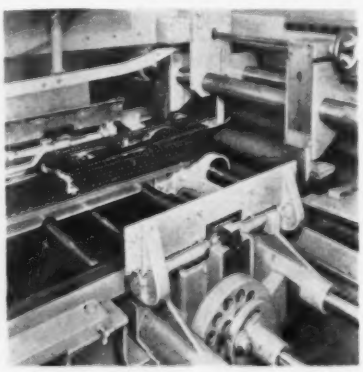


ment Corp. According to the manufacturer, this equipment alloys diodes under controlled conditions not obtainable with conventional processing equipment. Except for loading and unloading, the entire furnace operates automatically. The worker periodically places "boats" onto an external conveyor which automatically injects them into a vacuum-lock inlet. From here, work is belt conveyed through the heat zone where it undergoes processing temperatures up to 1000°C. It's then returned to the atmosphere through the vacuum-lock outlet. Set temperatures are maintained within 1°C by means of proportional control instruments which govern three heat zones within the furnace. Control is by the three-mode system: Rate, reset and proportional band. (C. I. Hayes, Inc.)

For more data circle No. 79 on postcard, p. 127

Folder-Gluer-Stitcher

An automatic folding machine has been redesigned to offer greater



production flexibility at low cost—for both large and small corrugated

box plants. It's ideal for small plants where there is a demand for a variety of box joints, but not enough to justify a single-purpose automatic machine. It is equally good in large plants where traffic jams are created by backlogs for single-purpose automatic machines. With its ability to handle large blanks while retaining rapid set-up and minimum space advantages, the machine is also an excellent companion to a high-speed folder-gluer which attains its greatest efficiency in the lower range of box sizes. (S & S Corrugated Paper Machinery Co., Inc.)

For more data circle No. 80 on postcard, p. 127

How Much Fallout?

Here's a particularly timely item. It's a personal radiation monitor,

about the size of a fountain pen. It provides continuous audible and visual indications of radiation levels. All its components are contained in an easily-decontaminated, stainless-steel casing. Worn in the breast pocket of the user, it provides simultaneous chirping sounds and light flashes at frequency intervals in proportion to the amount of gamma radiation present in an area. The distinctive chirping sound is near the point of maximum sensitivity on the hearing curve, 2800 cycles per second. Two instruments are available covering both low and high radiation ranges. One is most effective for the range from 1 milliroentgen per hour to 2 roentgen per hour with a continuous wail at higher levels. The other is most effective

New **ARMSTRONG**

Series "90" Ratchet

The ONLY Ratchet with ALL these important features!
1 Slenderized head
2 Thumb-operated reversing lever specially designed so it won't come off
3 Reversing-lever stop (Ball-and-spring prevents accidental shifting)
4 Simple to clean—only tool required is a Phillips screwdriver (wearable parts may be individually replaced)
5 Thin handle with knurled grip
6 Hole in handle for convenient hanging
7 Fine-toothed gear
8 Easy ratcheting action
9 ¼", ⅜", and ½" square drives (two handle lengths on ½" drive)

All wearable parts are replaceable; individually, inexpensively, easily. With no teeth cut into handle, it need never be replaced. *"ARMSTRONG" on these ratchets guarantees: advance design, top quality and tool sense. Extra heavy duty "50" Series ARMSTRONG ratchets (see right) in 1", ¾", ½", and ⅜" square drive sizes. Our General Catalog 700 gives complete information on these and approximately 5500 other ARMSTRONG TOOLS. Your local ARMSTRONG Distributors will supply you a Catalog and demonstrate the new ratchets. If you don't know who he is, write us for his name.

ARMSTRONG BROS. TOOL CO.

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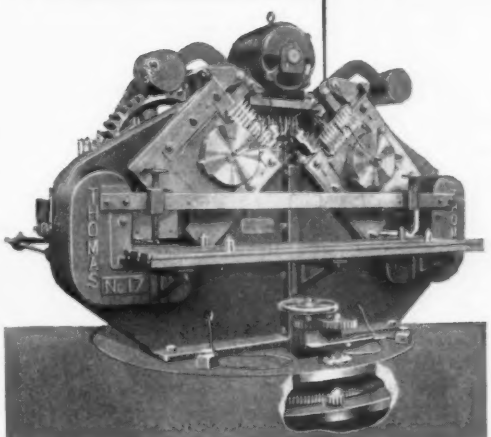
the trend is to THOMAS

double angle shears



The inbuilt quality and ruggedness of Thomas double angle shears insure years of trouble free service with a minimum of maintenance.

If you have a need for "high production" shearing of angles it will pay you to investigate Thomas.

Sizes are built for angles up to 8"x8"x1¼", with or without turn-table.

WRITE FOR BULLETIN 310-A

Punches • Shears • Presses
Spacing Tables • Benders

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PITTSBURGH 23, PA.

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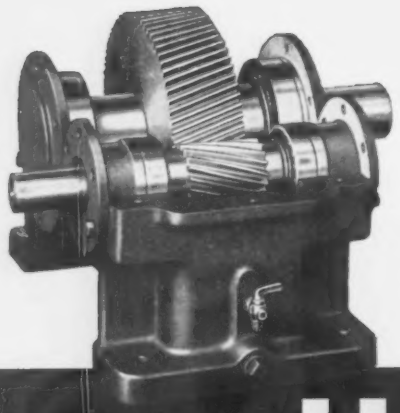

Fast Delivery on Custom Requirements

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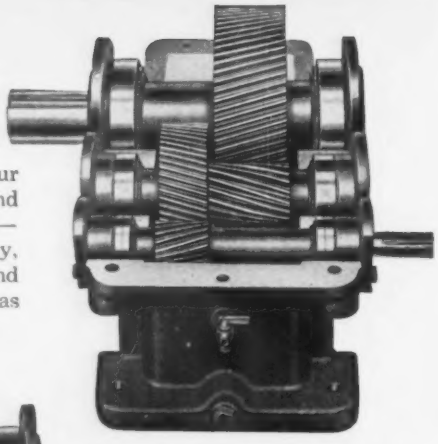
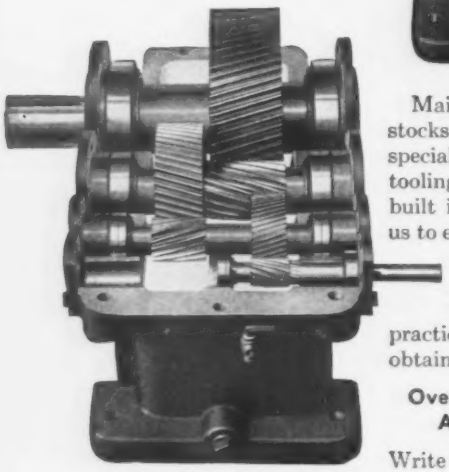
Helical Speed Reducers
Single · Double · Triple Reduction

You get *fast action* when you come to Horsburgh & Scott with your speed reducer and gearing problems.

We are able to meet your specifications—or design and build to your specific needs—products of highest quality, backed by the experience and reputation of many years as leaders in the gearing field.





Maintaining one of the largest stocks of patterns and blanks . . . special equipment and special tooling—much of it designed and built in our own plant—enables us to engineer and produce a wide range of custom gearing and transmission requirements, economically and practically as fast as you can obtain them from stock sources.

Overall design conforms to AGMA specifications

Write for details on wide size and capacity range of H&S Speed Reducers—Helical, Herringbone, Worm Gear and combinations.

The HORSBURGH & SCOTT CO.
5112 Hamilton Avenue • Cleveland 14, Ohio

Specializing in fast production of quality Speed Reducers and Gearing to meet custom requirements.

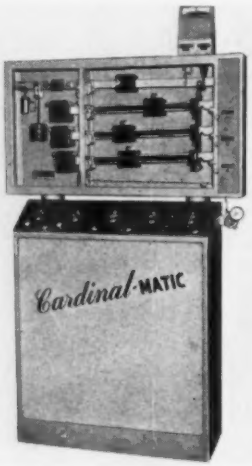
NEW EQUIPMENT

for the 10 milliroentgen per hour to 200 roentgen per hour range, although it provides a proportional indication from background to 10 milliroentgen per hour. This unit also provides a continuous wail at levels over 200 roentgen per hour. (Nuclear Materials and Equipment Corp.)

For more data circle No. 81 on postcard, p. 127

Weight Controller

Here's a new simplified, electromechanical control system for weighing, blending, or batching of two or more ingredients. These controls connect to conventional, mechanical-scale levers. Upkeep is



no problem, because in most any kind of a system breakdown, an ordinary electrician can make the repairs. The system, of course, is completely automatic and has automatic cut-off controls. In most cases, delivery can be made for any installation within a period of ten days. (Cardinal Scale Mfg. Co.)

For more data circle No. 82 on postcard, p. 127

Vaportight Lamps

For use in all locations where excessive fumes, dust or water are damaging to ordinary fixtures, a new lightweight portable floodlight is completely vapor tight. It's fully-sealed and protected with a heavy tempered-glass front lens and high-temperature silicone-rubber gaskets. The new unit is designed for severe-

service duty with plant, airport or municipal emergency squads, night-construction teams, and public utilities. The weatherproof cast-aluminum line includes standard or shock-proof low-voltage units up to 500 watts. For portable use or fixed-position installation, the units come in natural aluminum or bright fire-red finish. Cast guards, Twist-Lock connectors, and quick-release hold-down clamp kits are a few of the available accessories. (Stonco Electric Products Co.)

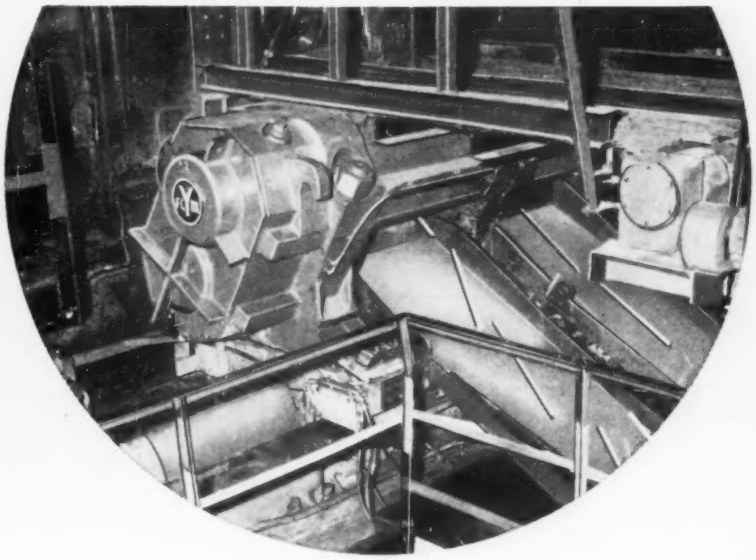
For more data circle No. 83 on postcard, p. 127

Accelerates Ions

Available in either a vertical or horizontal model, a new 600-kv particle accelerator offers highly-stable and continuous dc outputs from zero to 600 kv, with infinite adjustment. It's capable of producing a wide range of particles and radiations. Components are not en-

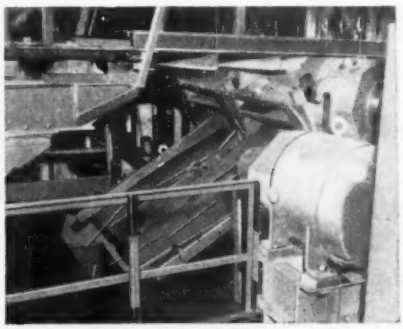
"YOUNGSTOWN"

Rotary-Type PLATE SCRAP CHOPPER



Unique Reciprocating Design prolongs knife life . . . saves downtime

Here's the scrap chopper designed for ruggedness and efficiency . . . built by "Youngstown" for a leading steel company. It handles side trimmer scrap 3" wide, ⅛" to ½" thick and cuts to 14⅛" constant length at speeds of 45 to 180 fpm. This rotary type scrap chopper is also built for ¾" and 1" thick plate; it can be built integrally with a side trimmer for a new line or application.



Scrap sliding down exit chutes from rotary chopper onto conveyor which discharges into scrap box or railroad car.

The arbor and housing assembly is designed as a separate unit mounted on a motor driven reciprocating carriage. Each arbor is equipped with four 30" long knives, with the knives so spaced that only one side is cutting at a time. This feature, along with the reciprocating action, insures longer time between knife dressings.

This design provides a spare housing and arbor assembly so that knives can be changed or adjusted on the floor, saving valuable mill time while changing knives. Housing and arbor assembly change time is held to a minimum through fast disconnect from drive and reciprocating carriage. Write for complete information.

THE YOUNGSTOWN FOUNDRY & MACHINE CO. 75th ANNIVERSARY SERVING INDUSTRY SINCE 1886

The Youngstown Foundry & Machine Co.

Youngstown 1, Ohio

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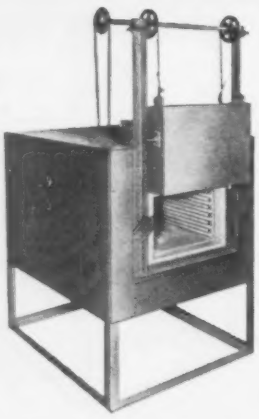


Originally designed to meet U. S. Air Force specifications (ninety-four furnaces have been delivered to date), the Lucifer 5055 Series furnaces are used for hardening, annealing, drawing and preheating applications . . . 2,000° F. and 2,300° F. This series is available in five standard models built for heavy use. All standard models include . . . an automatic controller, thermocouple, lead wire and magnetic contactor, vertical lift door, cast hearth plate, low watt density metallic elements mounted in our exclusive one piece monolithic holders, welded heavy steel plate reinforced casing, highest quality insulation brick throughout.

LUCIFER FURNACES, INC.
Neshaminy 17, Pennsylvania • Diamond 3-0411

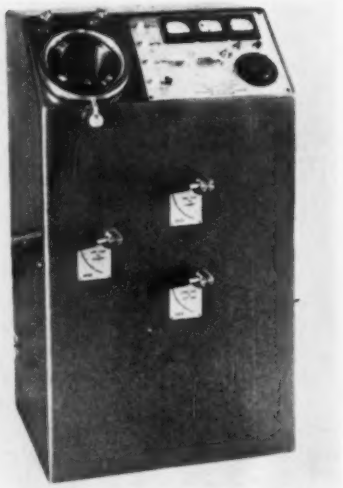
NEW EQUIPMENT

closed in a pressure vessel. Therefore, they're readily accessible. Both models are available with or without switching for acceleration of ions or electrons. In use as either an ion or electron accelerator, the unit is capable of supplying extremely strong radiation doses. Heart of the accelerator is a four-lens accelerator tube. Potential of the focusing electrode is supplied by an auxiliary power unit whose voltage can be adjusted from a control console. Other electrode potentials are derived from a resistance divider. The high frequency ion source is supplied by an alternator and remotely controlled by selsyns. (S.A.M.E.S.)

For more data circle No. 84 on postcard, p. 127

Cathodic Etching Unit

Cathodic etching, or ion bombardment in a vacuum, is used to develop the structure of metals, ceramics and cermets. And here's a new cathodic vacuum etcher that produces etched surfaces in just a few minutes. Some materials take only seconds. Also, fine crystallographic and structural details are revealed in either lightly- or deeply-etched samples. The instrument achieves a vacuum of 25-300 microns through a diffusion and fore pump. Its variable power supply can be up to 500 v and 59 ma rectified dc current. The unit's etching chamber contains a water-cooled cathode and a sample holder. Samples can be ¾-in. square or 1-in. diam. Power source required is 110-125-v ac. (Nuclear Materials and Equipment Corp.)



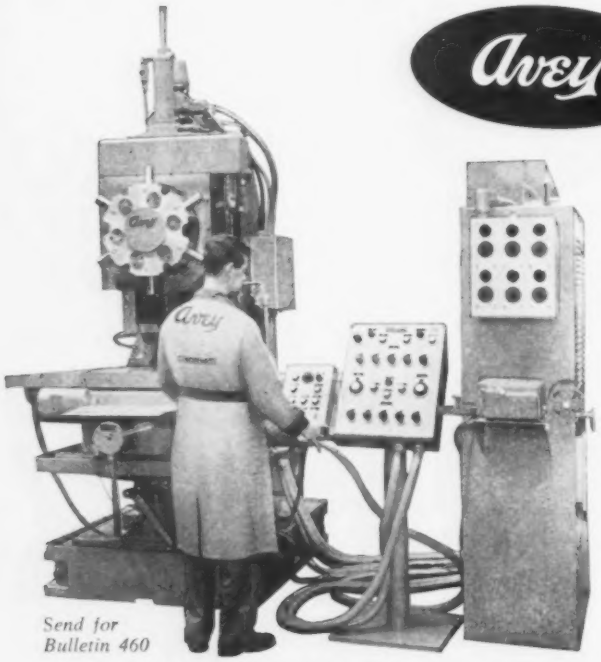
For more data circle No. 85 on postcard, p. 127

Dual Drive Lathe

This 5-hp lathe is not only built to strict toolroom tolerances, it's built sturdily enough to hold them. Among its wanted, toolroom features are apron reverse to the leadscrew, single-lever selection of 16 speeds from 31-2400 rpm, and a built-in horsepower meter. Its proved-in-service, dual-drive headstock provides 12 gear-driven spindle speeds for positive power in the lower ranges. Four belt-driven speeds promote smooth power in the high range. The three-bearing spindle uses precision bearings. Lubrication is automatic forced feed. A new electric clutch provides smooth and positive stops and starts. (LeBlond Machine Tool Co.)

For more data circle No. 86 on postcard, p. 127

6 precision spindles by Avey



Send for Bulletin 460

You can get this rugged Avey 250 Turret-Dex with either automatic or numerical controls. Rotary, 2- or 3-axis positioning. Pre-selected speeds, feeds, rapid advance, tapping cycles. Automatic depth control all spindles; automatic turret clamp; positive spindle stop; skip index. Capacity to 1¼". Eight spindles optional. Avey, Box 1264, Cincinnati 1, Ohio.

Pre-Negotiation Buildup Coming

Automotive and other big steel users have indicated their 1962 inventory plans.

In some cases, goal is a full 90 days of inventory. Late comers can get hurt in the rush.

■ A buildup of steel inventories similar to that of 1959 will be well underway in early 1962.

Auto companies will begin a planned buildup either in December or January. The goal of the automakers: Enough steel in stock by the end of June to finish up their 1962 model runs even if there is a prolonged steel strike.

Pattern Forms—Other big users will follow a similar pattern of strike hedging. This means that steel consumers who do not plan ahead against the buildup pattern will find themselves short of steel at a time when the economy is building up and a possible steel strike is bearing down on them.

Most of the steel companies have received some indication from their biggest customers that an inventory buildup will be launched early next year. For some, the goal will be an inventory of 90 days of steel.

The buildup will start from scratch. Inventory levels are now at a recession low. The advance plans of the automakers hint that the buildup may be a little more orderly than in 1959, but a pinch is sure to develop when the rush starts.

1959 in Review—Here is a review of the 1959 market as a parallel of what can happen in 1962 when the buildup starts:

At the start of 1959, steel inventories were at a 9-year low as the economy was emerging from the 1958-59 recession. By the end of January, the buildup was gaining momentum. Late in February came the first signs of steel users arranging conversion deals.

(Conversion is a costly process where the user will buy semi-finished steel from one source in hope of having it rolled at another mill that may have an excess of finishing capacity.)

Also by late February of 1959, a freight car shortage developed. Later in the buildup period, users who had "worked backward" from the strike deadline, by placing orders for tonnages for May delivery, were embarrassed when they saw the month literally dropped from mill schedules as they tried to get their books in order.

Short-Term Outlook — On the short-term market, the small improvement of the past two weeks continues to gain strength. This does not amount to a decisive lift, but the week-to-week business is picking up slowly and should continue to do so until the inventory rush starts.

Even though the automakers indicate their buildup may start in December, this date is not nailed down. The improvement in business now is directly the result of current needs. However, mills are starting to build up some stocks of semi-finished so they can fully utilize finishing capacities when needed.

While the order situation varies from mill to mill, November now shapes up as a better month than October, although not to a sensational degree.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	108	111	108	81
Buffalo	101	101	104	87
Pittsburgh	104	105	109	72
Youngstown	94	98	101	72
Cleveland	120	115	143	99
Detroit	136	133	123	94
Chicago	110	110	114	78
Cincinnati	133	127	124	83
St. Louis	128	127	119	93
Southern	101	101	106	79
Western	116	121	119	76
U. S. Index	109.7	110.4	112.8	79.3

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	2,044	2,057	80,765	87,504
Ingot Index				
(1957-59=100)	109.7	110.4	98.5	106.8
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$32.83	$34.50	$39.17	$28.33
No. 2 bundles	$23.18	$24.17	$26.17	$18.50

Buyer Meetings Take on New Zip

The New York Purchasing Agents Assn., typical of other groups, tries new approaches to interest members.

Sure-fire magnets: "On-time" meetings, controversial subjects, flexible formats.

■ Purchasing meetings are getting livelier. Officers of local groups of the National Assn. of Purchasing Agents in many cases are breathing new life into their regular get-togethers. And where they do, attendance figures rise. And purchasing in turn is getting a boost in status as buyers bring new knowledge from the meetings.

The big New York Purchasing Agents Assn. is typical of groups putting new meaning and interest in their sessions. As one move in this direction, the group at its dinner meetings has tossed the dais into discard. In an effort to break down the "stiff-neck reserve" of many meetings, officers mingle with members at various tables. They introduce new members to others and take part in questioning from the floor after talks have been presented.

New Spirit—Several members, as a result of this policy, have reported a feeling of "getting into things." The friendly atmosphere encourages them to "talk up and swap experiences with others." Many consider this experience-swapping the most valuable part of meetings.

This is the spirit that Donald T. Keliher, president of the New York association, is shooting for in his group.

"This is a real problem when you have about 950 members," says Mr. Keliher. But he is making headway. Mr. Keliher has long experience in purchasing and purchasing affairs.

KELIHER: Keep meetings moving.

He is director of purchases for U. S. Metals Refining Co. in Carteret, N. J.

"Hot" Subjects—The New York group features pre-dinner one-hour forums at its monthly meetings. And, like more and more association groups these days, "hot" subjects are getting head-on treatment. "This," Mr. Keliher confirms, "brings out the members in force." He makes the point-blank statement that "controversial subjects draw best."

Sample recent meeting subjects that have drawn well: Do You Negotiate or Chisel? . . . How To Live With Trade Relations.

Mr. Keliher stresses that lively or not, meetings still must be educational. And the New York group goes further and makes sure there is a heavy management flavor and content in their sessions. They are trying to give their members the broad management insight and knowledge often lacked by the middle-management groups.

Time Schedule—"A big drawing point in running meetings," says the leader of the New York group, "is keeping them on a tight time schedule." He points out that his group, because of the high number of commuters, places special need on strict schedules.

How does he accomplish this in a group of almost unwieldy size?

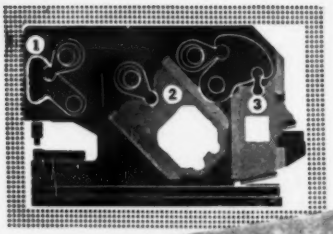
"The man I place in charge to keep the schedule working is myself," he says. Through his "office" as president, Mr. Keliher feels he, more than others, can make "stronger suggestions" to panelists and others to keep things moving.

"And I also help prepare the agenda," he points out. "This gives me a chance to 'pre-time' the sessions, and in some cases, delete anything that may cause sessions to run too long."

Change Format—Another point stressed by Mr. Keliher to give drawing power to meetings: "Be flexible. Be willing to change format or approach."

A case in point is the "shirtsleeve clinic" started recently in the New York group. It was discovered that many older members were not attending meetings regularly because they had "heard it all before." So special pre-dinner forums were set aside for veteran members where admission is by invitation of group officers. By edict, coats are not allowed to be worn at these meetings. The selected group wrestles with problems met by men long in the buying field.

In further efforts to give drawing power to meetings, Mr. Keliher and his officers have a special panel in mind. Called "Ask the Experts," this panel consists of five experienced PAs fielding questions from members at the meeting. The panelists will be rotated and will be of mixed specialities and wide experience. This panel is in response to member requests.



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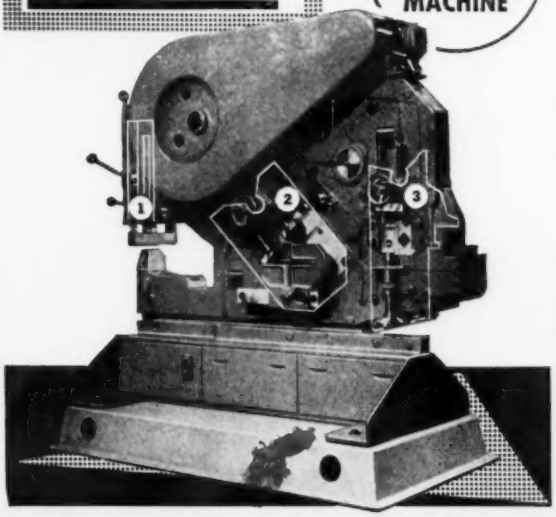

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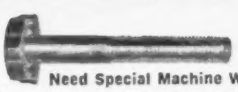

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Buyer Demands Shape Expansion

Auto and appliance industry needs encourage J&L to spend $60 million on a new, faster 80-in. hot-strip mill.

Unit will be designed to turn out product with better surface quality and closer gage tolerance.

▪ Buyer demand influences mill improvements. There's no better illustration of this than recent expansion moves at Jones & Laughlin Steel Corp.

J&L will spend $60 million to build a new 80-in. hot-strip mill at its Cleveland Works. The move is part of a $300 million improvement plan extending over the last twelve years. It includes two of the world's largest oxygen openhearths, now operating. (See p. 87.)

Quality Demanded—Automotive and appliance industry demands for better surface quality and closer gage tolerance are reasons for the strip mill, J&L says.

"Our decision to install a new and faster hot-strip mill in Cleveland will enable us to forge ahead in flat-rolled markets," says Avery Adams, J&L board chairman.

"Some of our keenest competition is in the automotive and appliance markets for our products, where continued advances in design make demands on us for the highest standards of quality and uniformity."

Buyer Benefits—It's also pointed out installation of the mill reflects the trend to substitute lower cost hot-rolled sheet for cold-rolled when an improved hot-rolled surface is adequate. A finer hot-rolled surface also makes possible better surfaces on cold-rolled, especially for auto industry use, J&L adds. With the new extended guarantee periods for cars, automakers are now more conscious about surface quality.

Sheet and Strip—The auto outlook for flat-rolled is best summed up by the steel buyer for a large auto frame and parts supplier. He expects his fourth quarter buying to move along at a fairly even rate. His schedules for November look no better or worse than October. And he foresees no early accelerated pace in steel buying by his company.

For many mills October was the best month so far this year for sheet and strip. Producers at **Pittsburgh** also expect little change up or down in November or December. But if automakers step up their activity, there could further improvement in demand. Inventory building by non-auto steel buyers could also help.

Cleveland mills don't expect any real influx of orders for the rest of the year. Mid-December delivery is quoted with users still confident they can get steel quickly if they need it. Warehouses are ordering slowly.

At **Chicago,** while actual booking gains are slight, customers are showing more interest in stock building. This could mean a surge of new orders in December. Some buyers are advancing their lead times on flat-rolled to 60 days. This despite average delivery on sheet of 3 to 4 weeks.

Bar — Mills are producing at about 75 pct of capacity. They are carrying large stocks of semi-finished in order to get quick delivery business. **Cleveland** mills report three-fourths of a month's business is still being booked within the same month. Inventory building is still minor. Mills in the **Chicago** area are operating at 18-20 turns a week for hot-rolled, putting the product on a 30- to 45-day cycle. Some buyers have been caught when product is off-quality. Replacement tonnages takes six weeks to deliver. Cold-finished bars are pacing the market in the **Midwest.** One mill says October was the best month since 1959.

Plates and Shapes — After dipping slightly in October, shipments of these products are expected to improve this month. **Pittsburgh** mills also believe gains will continue in December. Further west, plates are moving slightly better than expected at **Chicago.** But customers are showing little worry about deliveries. Structurals remain good, but have made only mild gains.

Service Centers — Several warehouses, lead by Chicago Steel Service Co. have reduced their discount on stainless sheet to 5 pct from the previous 7.5 pct. (Early in October the warehousing division of Jessop Steel Co. abandoned the discount entirely. But, so far, other suppliers have not followed this move.) Among those reducing the discount to 5 pct were Jos. T. Ryerson & Sons and Central Steel & Wire Co. On that basis the new discount was effective in Chicago, Indianapolis, St. Louis, and Milwaukee. Other areas were expected to follow.

PURCHASING AGENT'S CHECKLIST

What's behind recent break in scrap prices—and what lies ahead? P. 82

New buying systems used by the military eliminate duplication and cut costs. P. 86

Abrasive machining is way to reduce the cost of removing metal, expert says. P. 99

COMPARISON OF PRICES

(Effective Nov. 6, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Nov. 6 1961	Oct. 30 1961	Oct. 9 1961	Nov. 8 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	49.50	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.49¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Nov. 6 1961	Oct. 30 1961	Oct. 9 1961	Nov. 8 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.11
Foundry, South Cin'ti.	71.92	71.92	71.92	71.92
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	69.61
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. Cents per lb‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig Iron	$66.44	$66.44	$66.44	$66.32
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$33.50	$33.50	$37.50	$26.50
No. 1 steel, Phila. area	33.50*	37.50	40.50	33.00
No. 1 steel, Chicago	31.50*	32.50	39.50	25.50
No. 1 bundles, Detroit	29.50	29.50	33.50	21.50
Low phos., Youngstown	37.50	37.50	41.00	28.50
No. 1 mach'y cast., Pittsburgh	45.50	45.50	45.50	45.50
No. 1 mach'y cast., Phila.	47.50*	48.50	49.50	48.50
No. 1 mach'y cast., Chicago	44.50	44.50	49.50	41.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$32.83*	$34.50	$39.17	$28.33
No. 2 bundles	23.18*	24.17	26.17	18.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper electrolytic, Conn.	$31.00	$31.00	$31.00	$30.00
Copper, Lake, Conn.	31.00	31.00	31.00	30.00
Tin, Straits, N. Y.	123.50†	122.00**	120.25	104.00
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	24.00	24.00	24.00	26.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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No Upturn Sighted As Market Drifts

Bottom is not yet in sight for the sagging scrap market.

Prices fell again for the sixth straight week and few expect any improvement until January or February.

■ The scrap market continues its downward plunge, but the rate of decline eased this week. Price weakness is still general, but some grades are firming in various areas.

Mills are holding back. Some dealers feel mills will buy again, turning from hot metal to scrap when the price is right. Few in the industry expect any real improvement until January, however. (For a review of the 1961 scrap picture, and outlook for the winter, see page 82.)

Export remains the big letdown. Japanese and European buyers have closed their doors.

During the first 8 months of this year, ferrous scrap exports totaled 7.1 million tons, valued at $255 million. Tonnage was 58 pct ahead of last year's pace and pointed to a new export record.

Japanese sales alone totaled 4.6 million tons in the first eight months, compared with 3.5 million tons for the entire year 1960. Export scrap shipments to September this year equalled 17 pct of total U. S. consumption.

This boom has busted at least for now. Tapering off started in late September and export is merely a trickle now.

The Iron Age composite price for No. 1 heavy melting dropped to $32.83 this week, from $34.50, on the basis of declines in Chicago and Philadelphia. No. 2 bundles composite price fell to $23.18, from $24.17.

Pittsburgh—Prices of most grades are unchanged here. The market has yet to be tested at new levels. Dealers are resisting latest prices for No. 1 openhearth grades. But some feel these grades have not yet hit bottom. No. 2 bundles appear close to the cutoff point. A price of $25 at one local mill is producing only a limited flow. Quotations of $26 and $27 for shipments to a nearby district have put a floor under the local price. Lack of local demand has tended to weaken industrial prices further. Dealers are dropping their prices for turnings.

Chicago—The market drifted this week. Mills continue to hold off on new purchases, despite sharp price falls. Minor downward movement was offset by slightly higher prices paid for a few grades. Scrap movement, particularly in foundry grades, came to a halt. Railroad material is still leaving the district. Scrap is being laid down at current prices with an eye to year-end recovery.

Philadelphia—On the basis of a mill sale early this week, prices are off as much as $4. Export has dried up completely. At the new, lower prices, local mills may turn from hot metal to scrap and put some kind of a floor under the domestic market. But as it stands, the market is very weak.

New York—The market is quiet and weak. Several major dealers are still off the market. After the sharp fall last week, none of the other dealers are too eager to test the market. Some fear steelmaking grades may come down another $1 when exporters begin placing orders again.

Detroit—Near future of exports from this market is vague. Feeling is exporters won't want to spend much money here before spring because of storage costs, interest, and personal property taxes. Scrap has moved to Canada in some quantity, however, mainly No. 1 bundles. Canadian buyers may be attracted by current prices.

Cleveland—Brokers are covering small tonnages from restricted yards at about quoted levels as the market continues to feel for bottom. Production lists still overhang, plus rail scrap coming out.

Cincinnati—Small purchases at river points dropped market another $1.50 on No. 1 grades. Dealers will sell only small amounts at current prices.

St. Louis—Scrap prices continue to move down. But feeling is general that a bottom may have been reached, or is near. Mill interest is lacking. One mill is out of the market completely.

Birmingham — An Atlanta mill bought No. 2 heavy melting this week at $3 below its last purchase price. Furnace and cast grades also dropped $2 in other deals.

Buffalo—No. 1 grades dropped $2 this week in a weakened market. November mill orders fell far below expectations. Further price cuts appear likely but cast scrap is holding up with influx of Canadian buyers.

Boston — Prices dropped from 50¢ to $4 in the sharpest decline this year. Export has slumped completely. Domestic lag continues.

Houston—Market has weakened again. District mill issued orders for scrap but has no further buying plans for this year unless it rebuilds inventory.

West Coast—Prices dropped $1 per ton all along the coast. Most dealers expect prices to go lower.

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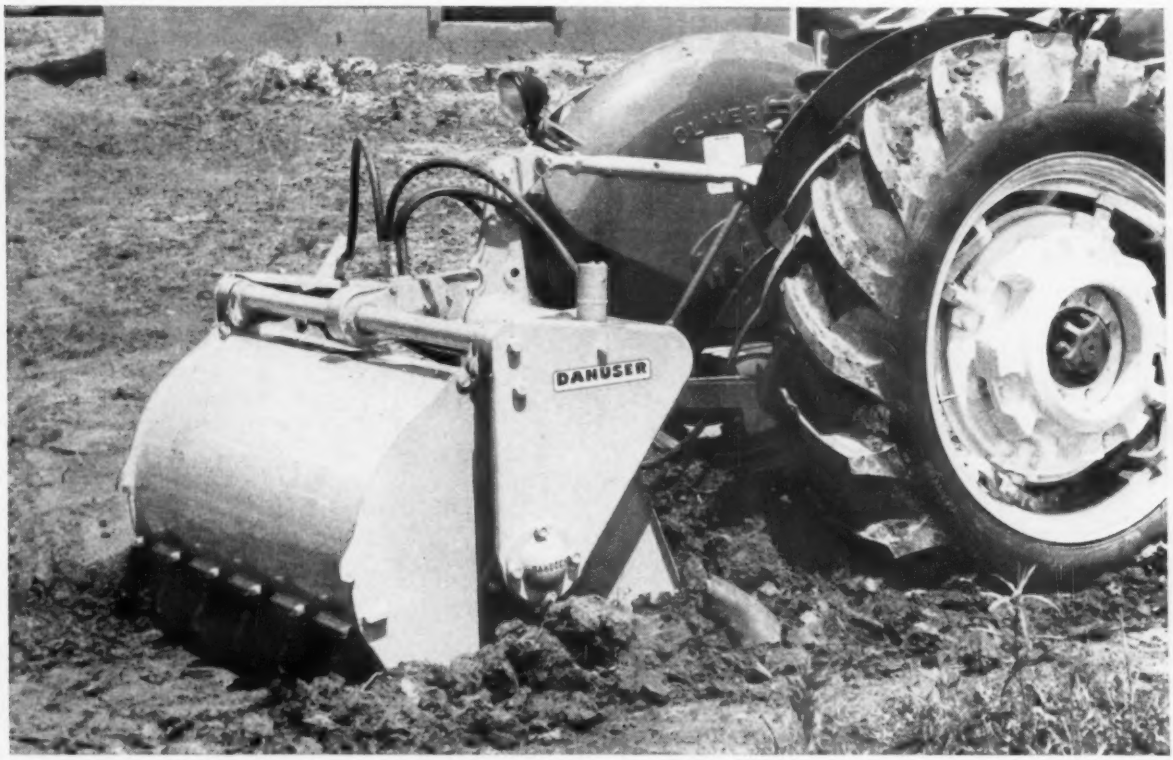
Terra Scoop, designed for maximum strength with minimum dead weight. Built by Danuser Machine Company, Fulton, Mo. Weighs only 540 pounds.



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USS United States Steel

SCRAP PRICES *(Effective Nov. 6, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	34.00 to 35.00
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate	41.00 to 42.00
Heavy turnings	29.00 to 30.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	51.00 to 52.00
RR specialties	44.00 to 45.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	115.00 to 120.00
430 bundles and solids.	85.00 to 90.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	41.00 to 42.00
Low phos. punch'gs plate, ¾ in. and heavier	40.00 to 41.00
Low phos. 2 ft and under	37.00 to 38.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	54.00 to 55.00
Rails 2 ft and under	46.00 to 47.00
Angles and splice bars	40.00 to 41.00
RR steel car axles	53.00 to 54.00
RR couplers and knuckles	40.00 to 41.00
No. 1 machinery cast.	44.00 to 45.00
Cupola cast.	37.00 to 38.00
Cast iron wheels	33.00 to 34.00
Malleable	42.00 to 43.00
Stove plate	31.00 to 32.00
Steel car wheels	38.00 to 39.00
Stainless	
18-8 bundles and solids	165.00 to 170.00
18-8 turnings	95.00 to 100.00
430 bundles and solids.	80.00 to 85.00
430 turnings	45.00 to 50.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	12.00 to 13.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	18.00 to 19.00
Clean cast. chem. borings	29.00 to 30.00
Low phos. 5 ft and under	39.00 to 40.00
Low phos. 2 ft punch'gs	41.00 to 42.00
Elec. furnace bundles	39.00 to 40.00
Heavy turnings	26.00 to 27.00
RR specialties	41.00 to 42.00
Rails, 18 in. and under	49.00 to 50.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	38.00 to 39.00
Cast iron car wheels	40.00 to 41.00
Malleable	47.00 to 48.00
No. 1 machinery cast.	47.00 to 48.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.50 to $32.50
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	32.50 to 33.50
No. 2 bundles	18.00 to 19.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	39.00 to 40.00
Rails, random length	41.00 to 42.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	34.00 to 35.00
Heavy breakable cast.	29.00 to 30.00
Drop broken cast.	44.00 to 45.00

Youngstown

No. 1 hvy. melting	$35.50 to $36.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	35.50 to 36.50
No. 2 bundles	21.00 to 22.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	37.00 to 38.00

Cleveland

No. 1 hvy. melting	$32.50 to $33.50
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	32.50 to 33.50
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	32.50 to 33.50
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Cut structural & plates, 2 ft & under	37.00 to 38.00
Low phos. punch'gs plate	33.50 to 34.50
Drop forge flashings	32.50 to 33.50
Foundry steel, 2 ft & under	32.50 to 33.50
No. 1 RR hvy. melting	36.00 to 37.00
Rails 2 ft and under	45.00 to 46.00
Rails 18 in. and under	46.00 to 47.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	42.00 to 43.00
No. 1 machinery cast.	43.00 to 44.00
Stove plate	37.00 to 38.00
Malleable	48.00 to 49.00
Stainless	
18-8 bundles	160.00 to 165.00
18-8 turnings	95.00 to 100.00
430 bundles	75.00 to 80.00

Buffalo

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	29.00 to 30.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	15.00 to 16.00
Low phos. plate	35.00 to 36.00
Structural and plate, 2 ft and under	37.00 to 38.00
Rails 2 ft and under	48.00 to 49.00
Scrap rails, random lgth.	38.00 to 39.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 cupola cast.	38.00 to 39.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
Foundry steel, 2 ft.	28.00 to 29.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	13.50 to 14.50
Shoveling turnings	15.50 to 16.50
Cast iron borings	21.00 to 22.00
No. 1 RR hvy. melting	35.00 to 36.00
Rails random lengths	39.00 to 40.00
Rails, 18 in. and under	43.00 to 44.00
RR specialties	39.00 to 40.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	30.00 to 31.00
Cast iron car wheels	33.00 to 34.00
Rerolling rails	53.00 to 54.00
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	9.00 to 10.00
Electric furnace bundles	36.00 to 37.00
Elec. furnace, 3 ft & under	34.00 to 35.00
Bar crops and plate	41.00 to 42.00
Structural and plate, 2 ft.	40.00 to 41.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rail, random lgth.	40.00 to 41.00
Rails, 18 in. and under	44.00 to 46.00
Angles and splice bars	44.00 to 45.00
No. 1 cupola cast.	38.00 to 39.00
Stove plate	38.00 to 39.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	29.00 to 30.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	15.00 to 16.00
Mixed bor. and turn.	5.00 to 6.00
Machine shop turnings	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	19.00 to 20.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	26.00 to 27.00
Drop forge flashings	26.00 to 27.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Heavy breakable cast.	27.00 to 28.00
Mixed cupola cast.	29.00 to 30.00
Automotive cast.	40.00 to 41.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	28.00 to 29.00
Machine shop turn.	3.00 to 4.00
Shoveling turnings	8.00 to 9.00
Clean cast. chem. borings	16.00 to 17.00
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	30.00 to 31.00
Heavy breakable cast.	30.00 to 30.50

San Francisco

No. 1 hvy. melting	$37.00
No. 2 hvy. melting	32.00
No. 1 dealer bundles	28.00
No. 2 bundles	23.00
Machine shop turn.	14.00
Cast iron borings	14.00
No. 1 cupola cast.	$49.00 to 50.00

Los Angeles

No. 1 hvy. melting	$37.00
No. 2 hvy. melting	32.00
No. 1 dealer bundles	27.00
No. 2 bundles	23.00
Machine shop turn.	14.00
Shoveling turnings	14.00
Cast iron borings	14.00
Elec. furnace 1 ft and under (foundry)	46.00
No. 1 cupola cast.	47.00

Seattle

No. 1 hvy. melting	$37.00
No. 2 hvy. melting	32.00
No. 2 bundles	23.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

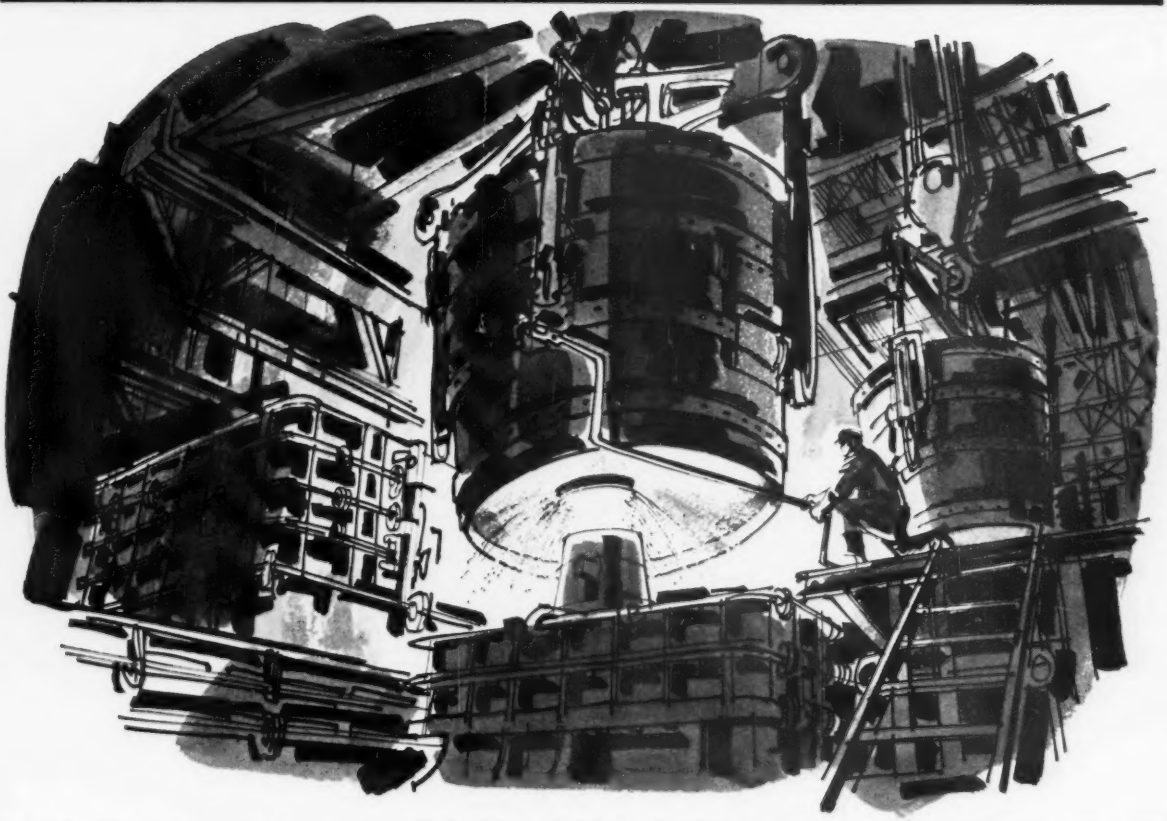
No. 1 hvy. melting	$30.00
No. 2 hvy. melting cut 3 ft and under	27.00
No. 1 dealer bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	22.00
Bush., New fact., prep'd.	30.00
Bush., new fact., unprep'd.	24.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	30.00
No. 2 bundles	21.00
Machine shop turn.	12.00
Shoveling turnings	15.00
Cut structural plate 2 ft & under	$44.00 to 45.00
Unstripped motor blocks	28.00 to 29.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	28.00 to 29.00

DANGEROUS INTRUDERS IN IRON AND STEEL



NICKEL . . . FRIEND OR FOE?

Nickel is a versatile metal which is used in combination with many other metals to produce a wide range of ferrous and nonferrous alloys. In its pure state, it is used for electroplating and as a catalyst in chemical reactions.

The strength, toughness, corrosion and heat resistant properties which nickel imparts to alloy and stainless steels have established its value to the steel industry.

Nickel may easily be separated from scrap but, since it readily alloys with steel, it cannot be entirely eliminated in the open hearth process. If unintentionally introduced into the furnace, nickel may contaminate the heat of steel in which it is present. It may also leave a residue in the furnace which will be absorbed by successive heats making it necessary for them to be diverted or scrapped.

The presence of nickel is undesirable in high grade silicon sheets or in steel scheduled for deep drawing purposes. In such cases, a valued friend becomes an unwelcome foe.

For scrap of known analysis, our personnel, equipment and strategically located facilities are specifically geared for the purchase or sale of dependably segregated metals. We welcome your inquiry.

Luria Brothers and Company, Inc.

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FOREIGN TRADE—LURIA INTERNATIONAL DIVISION, CHRYSLER BUILDING EAST, NEW YORK, N. Y. 5950 S. BOYLE AVE., LOS ANGELES 58, CAL. • *Cable Address:* FORENTRACO

Lead Has Hard Go In 'Soft' Market

London low and discount woe are leading causes of the domestic lead price decline.

Sales picture seems close to 1960 level since supply and demand aren't too far out of balance.

■ The domestic lead price dropped ½¢ per lb late last week, to 10.50¢ per lb in New York, and 10.30¢ per lb in St. Louis; this was the first price move in lead this year.

The market has been 'soft' for some time, this was especially evident during the last several weeks. One major seller reports widespread discounting, and the very low prices in London are the major factors that pulled the market down.

Import Prices—It had been generally known that imported lead was selling for about ½¢ under domestic metal on the East Coast. In recent weeks there have been repeated reports of domestic metal being sold under the market price.

One Example—A battery maker who had been buying lead oxide decided to make his own oxide and buy the lead. Estimated six-month lead needs were 10,000 tons.

Instead of distributing this business, as is usually done, the battery maker asked for tenders. One lead seller got all the business by offering ¼¢ per lb under the then market price.

Domestic Metal — There have been no reports yet of discounting domestic metal under the new price. Some sellers predict the possibility of discounting as long as the market stays 'soft.' However, they point out that lead is now at its lowest levels in a decade, and there can't be much room left for price cutting for many sellers.

The London price for lead has been running equal to 9½¢ per lb. Import quotas make this figure somewhat academic for primary lead, but fabricated lead products are not covered by the quotas.

Suppliers Pressed—U. S. fabricators have been pressuring their domestic lead suppliers to bring prices down to help discourage the shipping of too much fabricated lead from Europe—mainly sheet, pipe and oxides.

There was little immediate industry reaction to the lower price. The lead market in New York finished the week at 10.50¢ pretty much as it had opened at 11¢—'easy.' Sales were considerably better than the previous week.

Overall Picture—It appears that total lead sales in 1961 will be very close to what they were last year. Lead production and demand don't seem to be too far out of balance.

Aluminum

Latest end-use statistics of aluminum semi-fabricated products, from the Aluminum Assn., show a notable uptrend for building products and electrical markets.

For the quarter ending June 30, 1961, building products accounted for 23.8 pct of all wrought products, permanent mold and sand castings shipped by association members.

Upturn Cited—For the previous quarter this market had taken only 18.9 pct, and 20.6 pct the quarter before that. However, the upturn isn't a peak since building products accounted for 27.5 pct of the total in the third quarter last year.

Electrical market for aluminum moved up to 11.4 pct of shipments from 8.6 pct in the first quarter.

Other Changes—Most of the other categories changed only slightly. Down were: consumer durables to 9.5 pct from 10.7 the previous quarter; containers and packaging to 10.1 pct from 12.4 pct; shipment for conversion into wrought products to 5.4 pct.

Tin Prices for the Week

October 31 — 122.625; November 1 — 123.25; November 2—123.625; November 3 — 123.375; November 6—123.50.*

* Estimate.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in OCTOBER based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	31.00
Copper, Lake	31.00
Straits, Tin, New York	121.14
Zinc, E. St. Louis	11.50
Lead, St. Louis	10.80
Aluminum Ingot	24.00

Note: Quotations are on going prices.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	24.00	26.00	9/25/61
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	10.30	10.80	11/2/61
Lead, N. Y.	10.50	11.00	11/2/61
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	81.25	74.00	6/30/61
Titanium sponge	150 160	162 182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 167.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.037	.047-.060	.076-.096	.154-.250
1100, 3003	47.4	46.4	45.4	44.4
5052	54.8	52.0	49.8	46.8
6061-0	53.0	50.3	48.4	47.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-2 1/16	11/32-23/32	3/4-1 1/16	13/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	139	116	133
Shot, blocks	...	93	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	.....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Rod	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Muntz Metal	51.94	.....	47.25	.....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	.....
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod 34.77

TITANIUM

(Base 30,000 lb. f.o.b. customer's plant)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be ..... $ 5.00
Beryllium copper, per lb cont'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base ..... $ 1.31
Cobalt, 97-99% (per lb) ..... $1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz. $ 2.25
Iridium, dollars per troy oz. ..... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury dollars per 76-lb flask f.o.b. New York ..... $188 to $191
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel 77.50
Palladium, dollars per troy oz. ..... $24 to $26
Platinum, dollars per troy oz. ..... $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per pg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 32.00
- No. 120 ..... 31.25
- No. 123 ..... 30.50

80-10-10 ingot
- No. 305 ..... 36.00
- No. 315 ..... 33.75

88-10-2 ingot
- No. 210 ..... 43.75
- No. 215 ..... 40.50
- No. 245 ..... 35.75

Yellow ingot
- No. 405 ..... 27.50

Manganese bronze
- No. 421 ..... 31.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95.5 aluminum-silicon alloys
- 0.30 copper max. 23.25-23.75
- 0.60 copper max. 23.00-23.50

Piston alloys (No. 132 type) 25.00-26.00
No. 12 alum. (No. 2 grade) 21.25-21.75
108 alloy 21.75-22.25
195 alloy 24.25-24.75
13 alloy (0.60 copper max.) 23.00-23.50
AXS-679 (1 pct zinc) 21.50-22.50

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 22.75-23.75
- Grade 2—92-95% 21.50-22.50
- Grade 3—90-92% 20.50-21.50
- Grade 4—85-90% 19.50-20.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅝	18½
Red brass	23⅞	23⅛
Comm. bronze	24⅜	24
Mang. bronze	19¼	18½
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 27
- No. 2 copper wire 25
- Light copper 22⅜
- *Refining brass 23⅜
- Copper bearing material 22⅜

*Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 27
- No. 2 copper wire 25
- Light copper 22¾
- No. 1 composition 24
- No. 1 comp. turnings 23½
- Hvy. yellow brass solids 17½
- Heavy yellow brass turnings 16½
- Radiators 20

Aluminum

- Mixed old cast ..... 12 —12½
- Mixed new clips ..... 14 —14½
- Mixed turnings, dry ..... 13 —13½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 23½—24
- No. 2 copper wire ..... 21½—22
- Light copper ..... 19¼—19¾
- Auto radiators (unsweated) . 16¼—16½
- No. 1 composition ..... 20½—21
- No. 1 composition turnings .. 20 —20½
- Cocks and faucets ..... 16¾—17¼
- Clean heavy yellow brass ... 14¼—14¾
- Brass pipe ..... 16½—17
- New soft brass clippings .... 18¼—18¾
- No. 1 brass rod turnings .... 16 —16½

Aluminum

- Alum. pistons and struts .... 7 — 7½
- Aluminum crankcase ..... 9½—10
- 1100 (2s) aluminum clippings 11¾—12¼
- Old sheet and utensils ..... 9½—10
- Borings and turnings ..... 4½— 5
- Industrial castings ..... 9 — 9½
- 2020 (24s) clippings ..... 10½—11

Zinc

- New zinc clippings ..... 5 — 5¼
- Old zinc ..... 3 — 3¼
- Zinc routings ..... 1¾— 2
- Old die cast scrap ..... 1¾— 2

Nickel and Monel

- Pure nickel clippings ..... 56 —58
- Clean nickel turnings 43
- Nickel anodes ..... 56 —58
- Nickel rod ends ..... 56 —58
- New Monel clippings ..... 26 —26½
- Clean Monel turnings ..... 18½—19
- Old sheet Monel ..... 25 —25½
- Nickel silver clippings, mixed. 20
- Nickel silver turnings, mixed. 17

Lead

- Soft scrap lead ..... 7¼— 7½
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 90 —92
- No. 1 pewter ..... 65 —67
- Auto babbitt ..... 46 —47
- Mixed common babbitt ..... 10 —10½
- Solder joints ..... 15 —15½
- Small foundry type ..... 9 — 9½
- Monotype ..... 9¼— 9¾
- Lino. and stereotype ..... 8½— 8¾
- Electrotype ..... 8 — 8¼
- Hand picked type shells .... 5¾— 6¼
- Lino. and stereo. dross ..... 1¾— 2¼
- Electro dross ..... 2½— 3

(Effective Nov. 6, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R1*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1, T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

Electro-galvanized-plus galvanizing extras

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STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Cokes^ *1.25*-lb. base box	Electro^^ *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6, S15*	†Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. ^ COKES: 1.50-lb. add 25¢. ^^ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del. *												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*					7.575 *U1*	9.325 *U1*			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*			Hollowware Enameling 29 ga.—7.85 *U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; 7.95 *G2* at Granite City.		
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *U1, W8*		6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3, Y1.*		6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1 Y1,*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3* 10.125 *U1, J3**	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢. †† 7.425 at Sharon; Niles is 7.225.

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STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.		Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.		6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3, S15*		7.70 *B5*	6.725 *B3,R3, S15*	9.025 *B3,B5, S15*	8.30 *B3*	5.30 *B3*				8.00 *W6, S15*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*										
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.875 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, W15*		9.025 *A5, C13,W13*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,W13*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*		7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.10 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Nov. 6, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.
S15 Seaway Steel Div., Roblin Seaway Ind., Inc., North Tonawanda, N. Y.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
W13 Western Cold Drawn Steel, Div. of Standard Screw Co., Elyria, O.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	9.60	10.36	10.16	11.35	9.70	9.95	9.75	11.80	17.48	16.48	21.58	20.83
Birmingham		9.11	11.00	11.39	10.10	9.06	9.12	8.91	13.14	18.84	16.65	22.94	22.19
Boston**	.10	10.00	10.50	11.87	12.50	9.95	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.28	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.33	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	10.65	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	8.20	8.31	8.08	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	12.15	12.10	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.63	12.85	18.59	16.68	22.69	21.04
Milwaukee**	.15	9.51	10.49	10.42	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.34	20.59
New York**	.10	9.91	10.44	11.64	12.40	9.99	10.45	10.15	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.90	10.10	10.99	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.95	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.73	10.66	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	22.15
St. Paul	.15	8.97	9.64	10.79	11.14	8.81	9.32	8.97	11.64	.....	16.69	21.79	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars, 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¼" x 12"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot rolled bar—Rounds—⅝ x 15/16"; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120

(Effective Nov. 6, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	71.00†
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	68.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.50	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T1*	67.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31 0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

(Minimum plating charge — $10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25-21.50	—	19.75-21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	26.75	29.25-26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	31.50	35.00-31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	42.25	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	29.75	33.25-29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A5;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R5;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A5;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R5;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S15.* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A5;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A5;* Waukegan, *A5;* Canton, O., *T5, R5;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R5;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A5;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R5;* Chicago, Ill., *J4;* Watervliet, N. Y., *A5;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A5;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R5;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1;* Claymont, Del; *P2.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R5;* Watervliet, *A5;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

F.o.b. mills

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Nov. 6, 1961)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R4*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonsville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	...	...	...	...	...	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	...	...	...	...	...	9.00	9.55
Chicago *W7*	173	...	.	...	...	9.00	9.55†
Cleveland *A6*	...	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	9.00	...
Crawf'dav. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	...	...	...	...	...	...
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	...	194	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	...	...	...	...	...	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	...	...	...	...	...	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	...	...	...	236	...	9.95	10.50
SparrowsPt. *B3***	175	...	...	215	198	9.10	9.775
Struthers, O. *Y1**	...	...	...	...	...	8.65	9.20
Worcester *A5*	179	...	...	...	...	9.30	9.85
Williamsport *S5*	...	...	...	...	...	...	...

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.8	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

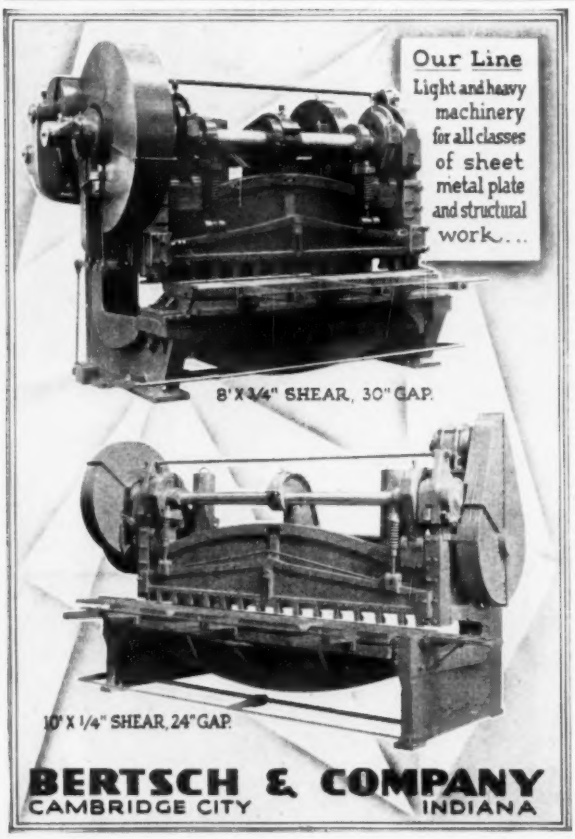
CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

	Net-Ton
Furnace, beehive (f.o.b.)	
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.70
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75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Light and heavy machinery for all classes of sheet metal plate and structural work...
8' X 3/4" SHEAR, 30" GAP.
10' X 1/4" SHEAR, 24" GAP.
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Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.
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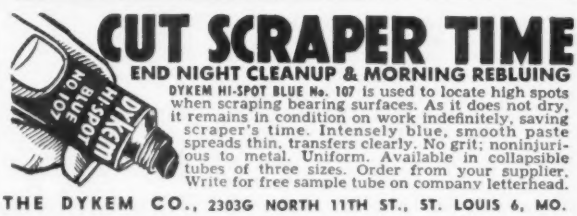
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DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on work indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; noninjurious to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead.
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FERROALLOY PRICES

NOTE: Prices of Boiler Tubes, Clad Steel, C-R Spring Steel, Electrical Sheets, Electrodes, Electroplating Supplies, Metal Powders, Rails and Track Supplies, and Refractories are published in alternate issues.

Ferrochrome

Base prices per lb of contained chromium, carload lots of lump material in bulk, unless noted.

High-Carbon

4.00-6.00% C, 55-63% Cr, 8-12% Si, .03% max S 23.00
4.00-7.00% C, 67-71% Cr, 1-2% Si.. 24.00
4.25% max C, 58-65% Cr, 1% max Si, .03% max S 24.00
5.25% max C, 58-65% Cr, 3% max Si, .03% max S 22.00

Low-Carbon

2.00% max C, 65-71% Cr, 2% max Si 32.50
.75% max C, 67-73% max Cr, 2% max Si 33.00
.025% max C, 68-73% Cr, 2% max Si 33.50
.05% max C, 67-73% Cr, 2% max Si 33.00
.05% max C, 63-67% Cr, 4-6% Si... 32.50

Bricks or Pellets

.025% max C, 63-68% Cr, 4-7% Si.. 32.50
.025% max C, 68-71% Cr, 2% max Si 33.00
.010% max C, 63-68% Cr, 4-7% Si.. 33.00
.010% max C, 68-71% Cr, 2% max Si 33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Ferrochrome Silicon

Carloads, delivered lump, per lb of material.

39-41% Cr, .05% max C, 42-45% Si. 11.50
44-47% Cr, .15% max C, 37-39% Si. 12.60

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅜" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk 24.00
Ton lots 27.35
Less ton lots 29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19%	$98.00	$96.00	$100.50
19-21%	100.00	98.00	102.50
21-23%	102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn (Bulk)	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si.... 14.50 75% Si.... 16.90
65% Si.... 15.75 85% Si.... 18.60
90% Si.... 20.00

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb...	2.40	3.30	4.55

(Effective Nov. 6, 1961)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y. per lb.

Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.63

Ferrocolumbium, 58-62% Cb, 2 in. x D, del'd per lb con't Cb

Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.89

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Vanadis, O., O., freight allowed, ton lots, per lb contained Ti $1.35
Less ton lots (200 lb and up) $1.37

Ferrotitanium, 30% low carbon, 0.10% C max., 27-32% Ti, Vanadis, O., freight allowed, per lb contained Ti, ton lots $1.35
Less ton lots (200 lb and up) $1.40

Ferrotitanium, 1-3% Carbon, 17-20% Ti, f.o.b. shipping point, freight allowed, carload per net ton $250.00
Ton lots $260.00

Ferrotungsten, ¼ x down packed per pounds contained W, ton lots delivered ..... $2.45 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth, Pa. $1.62
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.59

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
90 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb & over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

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300	G. E.	2300	250
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500	1800	G. E.	2300	KT-565Y
500	1200	G. E.	2300	KT-567
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HP	RPM	MAKE	VOLTS	TYPE
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1000	1200	Al.-Ch.	4000	ANY
1000	900	Al.-Ch	2300	ANY
700	720	G. E.	440	I-M
600	1800	G. E.	4160	M-6345
500	1200	G. E.	440	M-6345Z
400	1200	West.	2300	CW
400	720	G. E.	440	MT-573Y
350	1800	Al.-Ch.	2300	ARYW
300	900	G. E.	440	IM-17

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New York Dealers Note Real Pickup

Used machinery dealers in New York say business is now solidly picking up.

If the trend continues, some dealers figure they will finish 1961 well ahead of 1960.

■ After a long spell of promise but little performance, the market for used machinery is starting to perk up in the New York area.

A number of dealers now say that if the trend continues they will finish 1961 well ahead of last year. In fact, some estimate total business this year may be as much as 25 pct ahead of 1960, with the average much closer to 10 pct.

All pretty much agree that the fourth quarter will decide the story.

Firm Prices—What does this mean to prospective used tool buyers? For one thing, it indicates price tags are starting to mean something.

For much of this year, particularly through summer, dealers showed great willingness to shave prices to get sales. There is still some shaving done, but it's disappearing.

For another thing, the abundant supply of all types of late model equipment also shows signs of fading. Dealers emphasize that there is no shortage. But they say that if a buyer has something very specific in mind he is going to find only a handful of sources.

Shears Scarce—There has been some scarcity of shears reported. Strongest item now is heavy equipment. Most readily available: Lighter tools.

One dealer reports on a three-day auction of a wide variety of used tools in the Midwest as being indicative of both the current strength and trend in this market. He reports that about 500 people attended from all over the U. S. He estimates that only about 50 were dealers. Most of the buying was done by end users, or dealers acting as agents. Very little was sold to dealers for their stocks, he figures.

Paid More—Prices were reported to be very good. In fact, many end-user buyers paid more than they would have had to from a dealer. Top price: $200,000 for a large vertical boring mill.

The New York dealer says he returned from the Midwest with the feeling that price cutting is on the way out. Many end users are much more anxious for equipment than they had indicated.

Rate of inquiries continues to be good, which indicates the sharp upturn in business is liable to continue.

Some Caution—A few dealers are cautious. One has had three inquiries—from Milwaukee, western New York, and Baltimore—for the same basic piece of equipment. He figures these companies are bidding for a particular contract.

Dealers say the shortening of supply for very specific types of equipment has taken regional advantage out of the market. One reports that his last sale was to a California buyer. He says that if he has exactly what the buyer wants he can compete with just about anyone in the country, except for another dealer just around the corner from the buyer.

Foreign business still shows promise. But some dealers are starting to discount this market as being very worthwhile. Inquiries are good, but actual sales are still few and far between.

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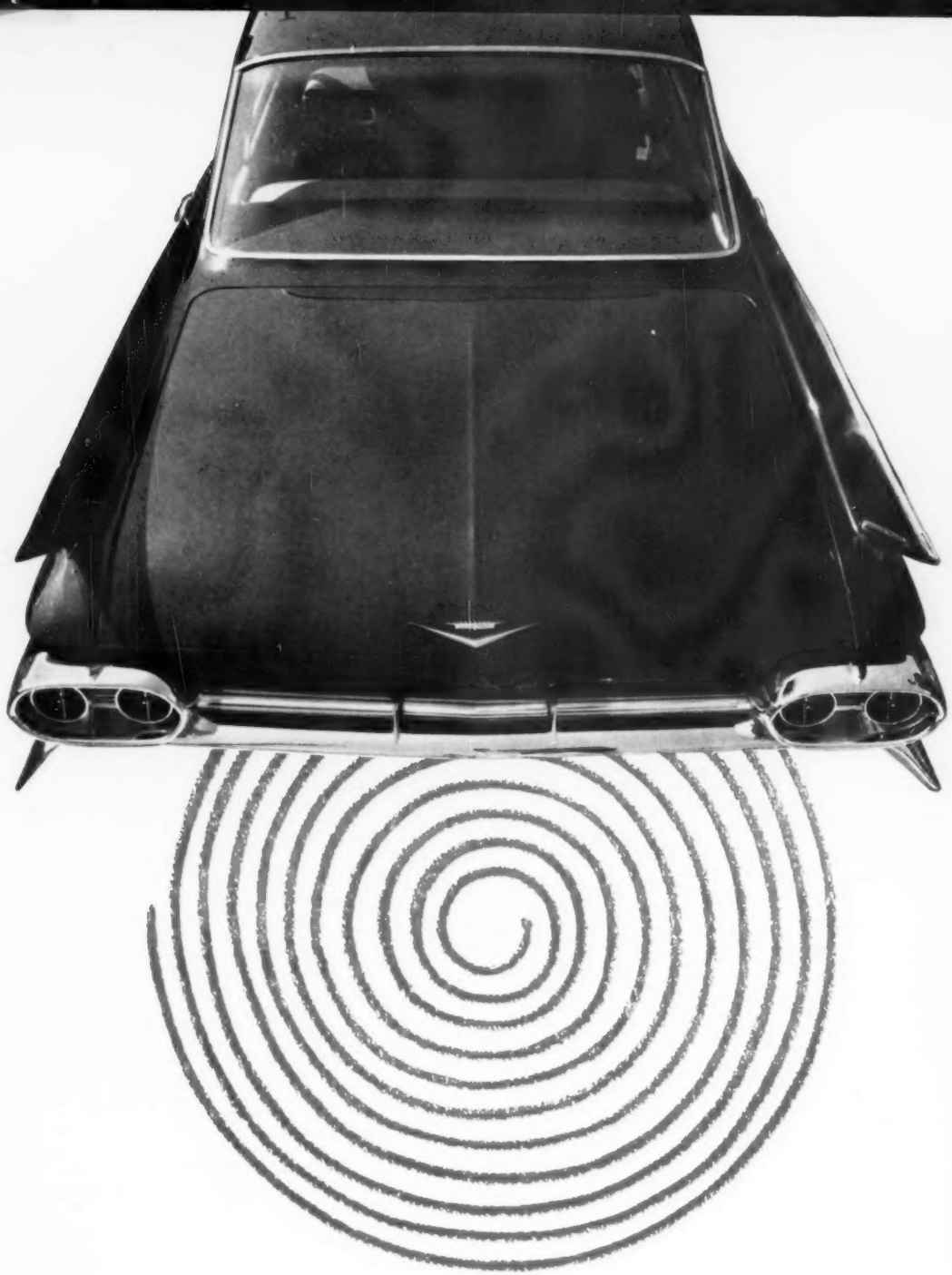

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